The IRON AGE

December 10, 1959 A Chilton Publication The National Metalworking Weekly

Special Report to Management—

How to Get More For Your Maintenance Dollar P. 93

Why Business Needs Faster Write-Offs – P. 61

ASM's Electronic Metals Library – P. 66

Digest of the Week – P. 2-3

MESTA ROLLS

For Quality and Tonnage...

EQUIP YOUR SLABBING AND BLOOMING MILLS WITH...

- Mesta Special Alloy Cast Steel Rolls
- Mesta Chrome-Moly Cast Steel Rolls
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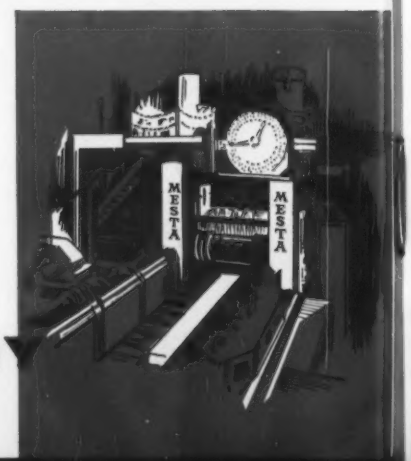

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

KNOW YOUR ALLOY STEELS...

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

How Heat-Treatment Affects Alloy Steels

Heat-treatment may be defined as an operation or series of operations involving the heating and cooling of steel in the solid state to develop the required properties. There are in general five different forms of heat-treatment used with alloy steel. These treatments modify the mechanical properties of the steel to suit the end use.

The five forms of treatment mentioned above, as applied to constructional alloy steels, are discussed in the following paragraphs:

(1) *Quenching and Tempering.* This form of heat-treatment usually consists of three successive operations: (a) heating the steel above the critical range, so that it approaches a uniform solid solution; (b) hardening the steel by quenching it in oil, water, brine, or salt; and (c) tempering the steel by reheating it to a point below the critical range in order to effect the proper combination of strength and ductility.

(2) *Normalizing.* A form of treatment in which the steel is heated to a predetermined temperature above the critical range, after which it is cooled to below the range in still air. The purpose of normalizing is to promote uniformity of structure and to alter mechanical properties.

(3) *Annealing.* This method consists of heating the steel to a point at or near the critical range, then cooling at a predetermined slow rate. Annealing is used to soften the steel, to improve machinability, to reduce stresses, to improve or restore ductility, and to modify other properties.

(4) *Spheroidize-Annealing.* This form of heat-treating requires prolonged heating of steel at an appropriate temperature, followed by slow cooling to produce a globular condition of the carbide. This treatment produces a structure which may be desirable for machining, cold-forming, or cold-drawing, or for the effect it will have on subsequent heat-treatment.

(5) *Stress-Relieving.* This is the process of reducing internal stresses by heating the steel to a temperature below the critical range, and holding for a time interval sufficient to equalize the temperature throughout the piece. The object of this treatment is to restore the elastic properties of the steel, or to reduce stresses that may have been induced by machining, cold-working, or welding.

Each of the five forms of heat-treatment will be the subject of a future advertisement.

Bethlehem metallurgists have had long experience in all methods of heat-treatment. They understand the possibilities and limitations of each method with respect to various alloy steels. These men will be glad to help you with any problems concerning heat-treatment. Feel free to ask for their services.

And call on Bethlehem, too, for the full range of AISI standard alloy steels, as well as special-analysis steels and all carbon grades. We can meet your needs promptly.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

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The IRON AGE

December 10, 1959—Vol. 184, No. 24

Digest of the Week in

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DEPRECIATION LAWS

Revision Coming?—House Ways and Means Committee opens hearings on depreciation laws. Most tax

experts, although methods differ, urge revision. Economic growth and competition against low-cost imports are key points. P. 61

STEEL LABOR

Stalemate Unbroken — Latest moves by company, union and mediators leave no encouragement for a break in the steel negotiations. P. 64

ELECTRONIC LIBRARY

Speeds Research—ASM's literature searching machine at Western Reserve Univ. can search through 100,000 technical papers an hour, sorting out those with data on a given topic. P. 66

WASHINGTON CLIMATE

Favors Steelworkers — With an election year coming up, Congress wants to avoid recession talk. It

Metalworking

◀ COVER FEATURE

PLAN UPKEEP — Your maintenance program should be flexible enough to meet normal demands and unforetold emergencies. This week's special report points out efficient results depend upon how you spend your maintanance dollar. SKF Industries, Inc., photo. P. 93

may try to force a settlement if one isn't reached voluntarily by the T-H deadline. P. 81

BOMARC PROGRAM

Cutbacks Unlikely—The Bomarc missile project looks immune to military budget cuts this fiscal year. Air Force will probably spend $400 million on Bomarc. P. 83

FEATURE ARTICLE

HOW TO GET MORE FROM MAINTENANCE DOLLAR

Maintenance vs Profits — The key to getting optimum machine performance is proper maintenance. A large chunk of manufacturing costs goes toward maintenance; therefore it pays to put the program on equal footing with other operations. P. 94

Fit Production Demand—Let a key man handle the program. Give them detailed responsibilities. Preventative maintenance is the byword to insure machine operation on a profitable basis. Use wise planning to lower costs and minimize downtime. P. 97

Understand Systems—It's up to you to understand your operating systems. The more that you know about them, the better you can tailor your maintenance to keep operation at top efficiency. Maintain a constant war against wear. P. 101

Paperwork Aids — Keeping records puts a powerful weapon in your hands. You can start with a simple maintenance history for each production unit. These records allow you to plan your maintenance schedule in a systematic manner. P. 104

Working Ideas — Reduce headaches by using work-saving ideas. Chronic problems can often be permanently eliminated. Consider items such as centralized lubrication when buying new equipment. P. 106

Fast Action—When failures occur, each member of your maintenance team should know his area of responsibility. Chart trouble-shooting procedures in a logical order. Advance planning insures plant-wide coordination. P. 107

MARKETS & PRICES

COLOR TV

Outlook—Color TV makers are looking for a sales increase in 1960. They say relatively economical sets are a few years away, but a breakthrough is coming. P. 69

BIG PRESS ORDERS

Domestic and Export—New features in presses are resulting in a big boom in forming tools. Automotive and appliance industries are the big buyers. European manufacturers are also coming into the market heavily. P. 85

STEEL SUMMARY

Eyes on Detroit—Availability of steel for many users depends on production schedules of automakers. If they reach their goal of 2½ million cars in the first half of 1960, it means they will be trying for nearly 30 pct of total shipments of finished steel. P. 137

PURCHASING

New Way—E. L. Bastian, purchasing agent, Lake Shore, Inc., has developed a new purchasing system that works well for his company. P. 138

NEXT WEEK

CAPITAL SPENDING

Latest Plans—Next week's special feature is the latest of continuing quarterly surveys of metalworking's capital appropriations. Survey results are interpreted to show future trends in spending for new plants and equipment.

TOOL TOLERANCES

Sensible Statistics — Tolerances for machine tools need reliable controls. Mathematics provide the solution. Next week's technical feature explains how to put sense into tolerances for machine accuracy and repeatability.

Automatic marking of hot steel . . .

Controls by ALLEN-BRADLEY, of course

Here's an interesting job that's gone "push button"—stamping heat numbers on hot steel! Now, from a remote console, the operator automatically sets numbers on the marking head and propels it against the steel. The controls, *of course*, are Allen-Bradley because they provide the continuous reliability that is essential to this production.

The simple, ONE moving part solenoid design of A-B starters and relays assures millions of trouble free operations. And the double break, silver contacts—used on all A-B control—eliminate costly downtime for maintenance. Keep your production lines rolling . . . insist on Allen-Bradley *quality* motor control. You cannot do better!

Allen-Bradley Co., 1341 S. First St., Milwaukee 4, Wis.
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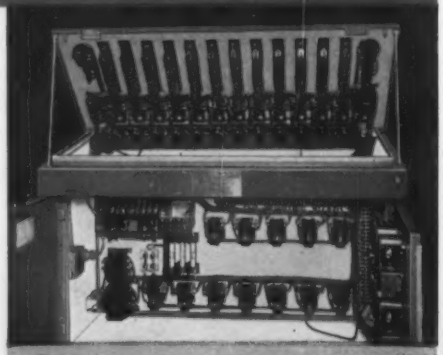
Member of NEMA

Quality Motor Control



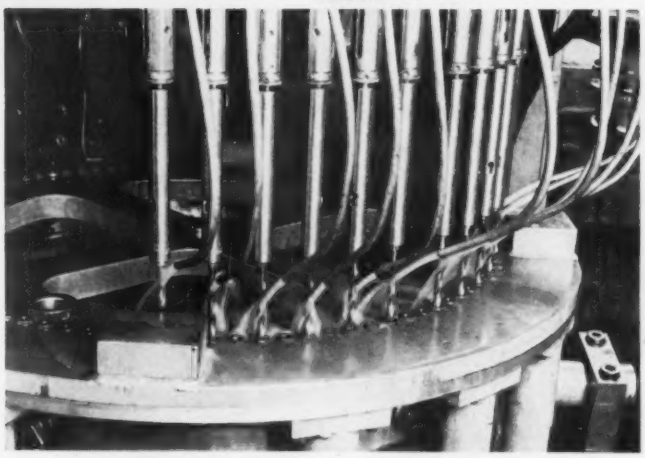
The relays and push buttons used in the remote control console of this M. E. Cunningham Marking Machine are all standard Allen-Bradley catalog items.

USE A GRADE OF

Hamikleer

REG. U.S. PAT. OFF.

To insure clean, non-rancid, clear solutions which provide maximum rustproofing, cooling, finish and tool life



HAMIKLEER coolants are a series of odorless synthetics and rust preventives. They dissolve instantly in any water to make a clear, thin solution that can be made more dilute than is practical for ordinary soluble oils.

• HAMIKLEER odorless coolants and rust preventives were the first oil-free water soluble coolants with oily properties. These popular, cost-cutting coolants are now available as straight synthetics, synthetics with added lubricity and synthetics with added lubricity and extreme pressure qualities.

Whichever grade you use, HAMIKLEER . . .

INCREASES PRODUCTION by reducing rejects, providing finer surface finishes, always keeping the work cool, clean and visible.

INCREASES TOOL LIFE through excellent lubricity, heat-absorbing and anti-weld properties.

ELIMINATES COSTLY DISPOSAL PROBLEMS because it can be disposed of through regular outlets, if oils do not get into the mixture, and it will not pollute streams.

LASTS LONGER because it makes "water-thin" solutions, in any ratio of dilution, which holds to a minimum the amount carried away. It outlasts soluble oil emulsions by five times.

WILL NOT TURN RANCID so operators are not bothered by foul odors. In addition, HAMIKLEER will not affect workers' hands.

PREVENTS RUST even in hot, humid weather—and it eliminates costly cleaning operations.

This free test kit is sent to all HAMIKLEER users. It permits operators to test dilution right at the machine, *saving considerable time.*

As you can see, a HAMIKLEER *synthetic coolant has much to offer. Write us today for a free sample to test on your own metalworking operations.*

HARRY MILLER CORP. HAMICO 4TH & BRISTOL STREETS PHILADELPHIA 40, PA.

Manufacturers of
IMMUNOL, STEELGARD, ACTIVOL,
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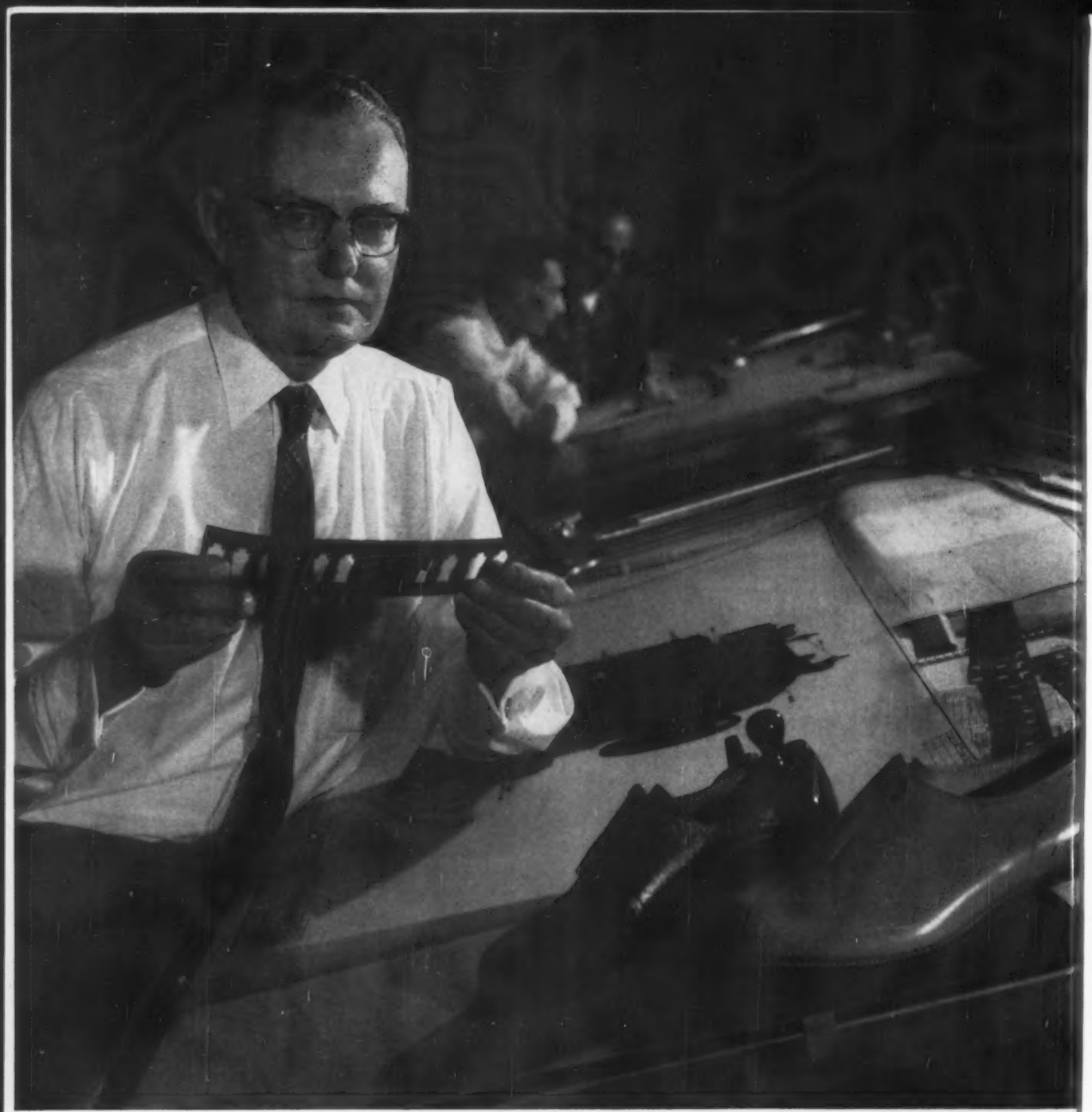


PHOTO BY KARSH OF OTTAWA

"Materials are important to the designer. . . thats why Talon, Inc. works with Sharon"—THANE E. HAWKINS, chief engineer, Shu-Lok Fastener Division, Talon, Inc.

"To design properly the engineer has to know materials—their advantages and limitations," states Thane E. Hawkins, chief engineer, Shu-Lok Fastener Division of Talon, Inc.

"The Shu-Lok, we knew, would have to absorb extra heavy punishment—yet be as inconspicuous as possible. This meant a small, tough precision product. These factors dictated the use of steel—stainless steel. To get the quality stainless we needed, it was only natural to look to *Sharon Steel Corporation, Sharon, Pa.*"

SHARONSTEEL **SHARON** *Quality* **STEEL**

The Little Woman: They Are After Her Again

Some time ago, the little woman was made a guinea pig for her husband's business fitness. Remember the days when she was interviewed before he got the job—or the promotion?

The storm of protest was heavy. But it died down as we found other things to decry. The better half continued to kid males who were setting up—so they thought—rules for her to follow.

Lately, some bigdomes are insisting that the wife is really conservative. They say she runs the show. Ergo! Then she can be used to boost her husband's productivity—at work, that is.

That will mean more pay—and, to her, more security, the researchers say. Sounds great, too. It's just the way she wants them to think. She may need a new coat (car, dress, hairdo). So feeling secure, she gets what she wants. She puts it on the old man's cuff—credit to you.

We are in the midst of a titanic struggle for steelworkers' minds. Companies and the union are barraging workers with long letters, booklets, ads, radio and bombast. This is fair game for the big election coming up. Then the steelworkers will vote on the companies' "last offer."

Some of the material has a high fog index. The higher it is, the harder it is to read the stuff. If some of the much—and unfairly—maligned Madison Avenue fellows had a crack at this material, changes would be made. Seventy word sentences would be cut up—or eliminated. Legal stuff would be made into simple language.

But where does the little woman come in here? Some companies, and the union, hope she will read the propaganda (sic, see your dictionary). Then she will—they hope—make herself felt in a brain wave with her old man. She will, they hope, kind of tell him what to do—subtly, of course.

Imagine, if you can: The old man comes home. Spots the "boss" reading up on 2-B local practices. He is thirsty and hungry. Blows lid. She argues she is interested in their welfare and her security. He says, "Get the beer first and get going with supper."

Is this likely? Hardly. When the old duffer gets home, the beer will be cold. Supper is on the table. Union and company letters will be on the counter with last month's bills, old notes to the milkman, grocery lists, and Christmas lists—to be looked at "later."

When the vote comes it will be for or against the union. The old man will be alone in the booth. The little woman won't be there.

Tom Campbell

Editor-in-Chief

CASE HISTORIES

New Departure super precision angular contact bearings add new sales appeal to high frequency grinding spindles.

Photo: Courtesy Bryant Chucking Grinder Co., Springfield, Vermont

Ball Bearings Cut Costs $180.00 On 100,000 RPM Grinding Spindle!

CUSTOMER PROBLEM:

Machine tool maker experienced excessive assembly time with integral shaft type ball bearings in the production of 100,000-rpm grinding spindles for precision grinders. The ball bearing, with ground shaft serving as inner race, plus special balls, separator and outer race, required careful parts matching and assembly. Also, shaft and bearing replacement costs, if required, were high.

SOLUTION:

N/D Sales Engineer, in cooperation with the manufacturer, recommended using New Departure production ball bearings fitted directly to the shaft. These super precision, ultra high speed ball bearings eliminated the need for ball track grinding and delicate eccentricity matching at assembly. Using N/D ball bearings and engineering assistance, the manufacturer reduced parts and assembly costs $180 per unit. What's more, in the rare case of spindle damage, shaft assembly replacement costs have now been reduced $175 (over earlier models) . . . shaft assembly or bearings can be replaced separately, thanks to New Departure.

If you are working on new machine tool designs, or have questionable production costs, why not contact New Departure? There's probably a precision N/D production ball bearing that can save you time or money! Call or write New Departure Division, General Motors Corp., Bristol, Conn.

NEW DEPARTURE
BALL BEARINGS
proved reliability you can build around

Lithium Degasses Steel

Lithium, the lightest metal, is now being used to remove gases from steel melts. A major steel producer reports that additions of lithium metal to the heat, plus purging with argon, are producing Type 430 stainless steel with low gas contents. Trials are continuing with other grades and different additions.

Increase Bolt Life

Bolt life is being lengthened by a new concept in thread design. The secret lies in the effect of the nut on bolt fatigue. Used on standard bolts, the new nuts have increased the fatigue life by at least three times in tests to date. The same principle can be applied to any threaded fastener.

Inspect Hot Billets

Instantaneous inspecting of hot steel billets up to 12-in. thick is now possible. The unit, a 31-Mev betatron, can detect pipes and cavities in billets as they travel on the roller table. The penetrating pattern is picked up and sent via closed-circuit television to a monitoring operator. Advantages: foreman can make accurate cut to remove pipe; no temperature loss in ingot during testing.

Try Sheet Steel Radiator

At least one earthmoving equipment maker has switched from the conventional, cast iron radiator bolted to the frame to a small stamped "floating" radiator of the light automotive type. The new unit, formed in steel sheet, is hot-dip galvanized after forming.

Metal Films for Computers

Magnetic metal films, as little as 50 atoms thick, may be the answer to making high speed computers work even faster. Made by evaporating metals such as iron, nickel, and their alloys in a vacuum, the films can be spontaneously magnetized below certain temperatures. These magnetic patterns can be changed very fast, and generate small voltages which provide signals to the computer.

Pour High Density Metal

High density metal is now available in spheres which can be poured like sand or pumped in a viscous solution to fill a volume of given shape. Made from tungsten, nickel and copper, the metal has a density of about 17 g per cc. The new spheres will allow the forming of shields for radioactive materials at the site—without machining or fitting. Operating temperatures go up to 750°F.

Integrate Steel Mill

Direct reduction and pressure casting are being considered by a stainless steel producer in a plan for full integration. Low grade ores would yield both iron and nickel in the proposed layout. Pressure casting would eliminate the need for primary mills.

Report on Machining

Recent reports deal with the machining characteristics of high-strength, thermal-resistant materials. This study on turning, milling, and drilling includes such metals as AISI 4340, A-286, AM-350, Chromalloy and HS-25. The machining data is in graphical form to show the relationship between tool life, cutting speed, feed, tool geometry, and tool material.

Glass Protects Steel

A new glass is being heralded as the most significant glass development in recent years. Claimed to be the most corrosion-resistant glass ever applied to steel, it has been developed for lining vessels, storage tanks, reactors, and rotary dryer-blenders. According to Glascote spokesmen, the new glass answers demands for linings to withstand corrosive acids and alkalies at higher operating temperatures.

THE ONES THAT WILL LAST (and last, and last!)? THOSE MADE OF WEIRKOTE® ZINC-COATED STEEL!

Laboratory salt-spray tests prove it. Leading manufacturers prove it. Experience proves it. Primary window frames and storm and screen frames of Weirkote zinc-coated steel last and last and last—literally shrug off the elements!

Weirkote will not give in to corrosion invasion because its zinc coat clings tightly to its steel surface year after year. Reason? Zinc and steel are actually integrated by Weirkote's continuous process.

This extra protection pays off when it comes to fabricating Weirkote, too. You can crimp it, twist it, torture it—work it to the limits of the steel itself—without chipping or flaking its surface. And this pays off in your pocketbook: No more costly rejects, and coating after fabrication can be eliminated.

Whether you're talking profit or product, there's a lot to be said for Weirkote zinc-coated steel. Write today for a free booklet that tells all about it. Weirton Steel Company, Dept. A-14, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

LETTERS FROM READERS

Popular Demand

Sir—We read your article with great interest because the Link-Belt Speeder Corporation uses the principles discussed by Mr. Fuller in the manufacture of our tubular crane booms. Using the tetrahedron principle, we have obtained a maximum boom length of 150 feet where formerly a 100 foot length was considered maximum.

We are very enthusiastic with this design and would like very much to secure reprints of this article to pass out to our distributor organization and to their salesmen. If at all possible, we would like 1500 copies for this purpose.—H. M. Gallagher, Supervisor Sales Correspondence, Link-Belt Speeder Corp., Cedar Rapids, Iowa.

Sir — We respectfully request three reprints of the article "Bold Building Concepts Mean New Markets for Metals."

Spread the word: More articles like this one are desired in your magazine.

These copies are intended to be passed through part of the administration of the Los Angeles City Schools. — C. S. Horn, Teacher, Metalworking, Van Nuys, Calif.

Sir—Your article "Bold Building Concepts Mean New Markets for Metals" concerning the spectacular ideas of R. Buckminster Fuller with regard to his use of metals in building was of great interest.

Will you please send us two reprints of this article which appeared in your Nov. 12, 1959 issue.—J. F. Pizzirusso, Assistant Professor of Mechanical Engineering, The Cooper Union for the Advancement of Science and Art, New York.

▪ **Reprints are being sent.—Ed.**

Some Questions

Sir—Since you believe in forthright speech as evidenced by your editorials, I've got to relieve the "slow burn" that has troubled me since the beginning of the steel strike.

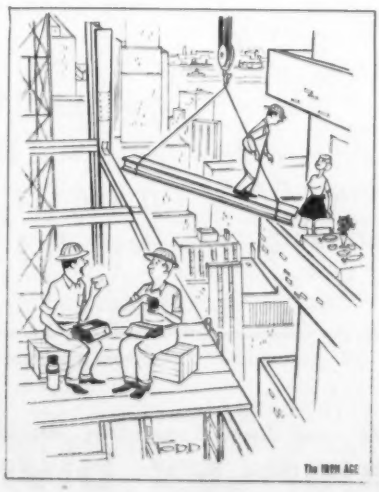
Here are some questions concerning strikes in essential industries:

1. Is it a "divine right" of workmen in an essential industry to cease work en masse, thus depriving in other occupations almost as large a group of people of their livelihood?

2. What happens to the millions of retired and aged investors in industry who depend on the earnings of their savings? Do they receive any retroactive increase after industry starts up again?

3. Can't doctors and nurses band together and enforce demands for greater rewards for their services at the same time. Why haven't they this "divine" right to strike?

4. Who is going to pay the deficit in taxes resulting from prolonged stoppages?—G. C. Riegel, retired consultant, Asheville.



Al's lucky, being able to get home for lunch.

in fasteners
Southern is
GROWTH

Someone has said that it is no longer possible for business to stand still, for those which are stationary are left behind by those who are "on the **grow.**" Southern Screw Company's **growth** in a comparatively short time is due to its ability to make better products for **growing** customers. Southern is dedicated to making better fasteners, giving better service, providing better packaging—at prices that are fair **and** competitive. It is not strange that Southern Screw's **growth** has kept pace with those we serve.

If yours is a **growth** company, Southern Screw in all probability is having an important part in your progress. If we are not now growing with you, perhaps it would be mutually beneficial to become a part of each other's **growth** pattern.

Direct your inquiries for quotations and samples to: Southern Screw Company, P. O. Box 1360, Statesville, North Carolina.

Machine Screws & Nuts • Tapping Screws
Stove Bolts • Wood Drive Screws
Carriage Bolts • Wood Screws
Dowel Screws • Hanger Bolts

Manufacturing and Main Stock in Statesville, North Carolina

Warehouses:
New York • Chicago • Dallas • Los Angeles

Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA

What's more important to you

QDP or PDQ?*

Whirlpool Corporation reports: among 598, 265 components supplied by Amplex the first 4 months of 1959, there were only 5 rejects!

Quality, Delivery, Price... this Amplex philosophy enables our customers to cut their production and warranty costs.

The "Price" vendor with poor quality will increase your costs.

Amplex prices are low but cost-saving quality always comes first. A quality record of 99.999992% is the reason why Whirlpool Corporation says, "Quality is our business, too. That's why we purchase components from Amplex."

Contact your local Oilite® representative today. Reduce your costs with quality-controlled Oilite Precision Parts and Bearings. See "Bearings" in the Yellow Pages or write to Dept. R-12.

* *Quality-Delivery-Price vs. Price-Delivery-Quality*

® Only Chrysler makes Oilite

SINCE 1929 A CHRYSLER OILITE PRODUCT

the most trusted name in powder metallurgy!

AMPLEX DIVISION

CHRYSLER CORPORATION, DETROIT 31, MICHIGAN

PRECISION PARTS • SELF-LUBRICATING BEARINGS • METAL FILTERS • FRICTION UNITS

Out of Line

At the Buffalo Forge Co. engineers and designers are usually busy developing new lines of air handling equipment and machine tools and pumps.

But in their off time, like everyone else, they enjoy a good outdoor barbeque in their back yards or in an indoor fireplace. But they found they weren't getting the gourmet's delights they wanted because broilers they were using just didn't have what it takes to make a good steak.

Tasty Turn—So, they got their creative heads together and decided to make their own outdoor indoor broiler. The results, they say, are tasty.

And the results for Buffalo Forge look the same. It's a little out of their usual line, they say, but they've begun to market the new broiler. (It fits in standard indoor fireplaces).

The new Broil-Air features a hand-cranked cut steel gear for easily controlled heat; heavy steel construction; porcelainized fire pan, grill and serving shelf for easy cleaning, and a lever adjusted grill.

And being in the Christmas spirit, Buffalo Forge is offering the Broil-Air to men in the metalworking industry at discounts ranging from 10 to 25 pct off list price.

JERRY LEWIS COLLAPSES ON HOLLYWOOD STAGE

HOLLYWOOD (UPI)—Comedian Jerry Lewis, 33, collapsed Tuesday after running several times up a long flight of stairs while making a motion picture, but he recovered a short time later and returned to his acting chores.

Lewis was given an electrocardiagram examination by Dr. Marvin Levy which showed he did not suffer a heart attack. Levy described the collapse similar to that of a man who runs the 100 yard dash, collapses and is all right in a few minutes.

The union's strategy, according to Iron Age, is to isolate the steel industry as the last holdout in hopes of putting "irresistable" pressure on the steel industry for a settlement.

The above item appeared in the Colton, Calif., Courier. We hope that strategy we quoted helped and that Mr. Lewis is feeling better because of it.

With Crackers

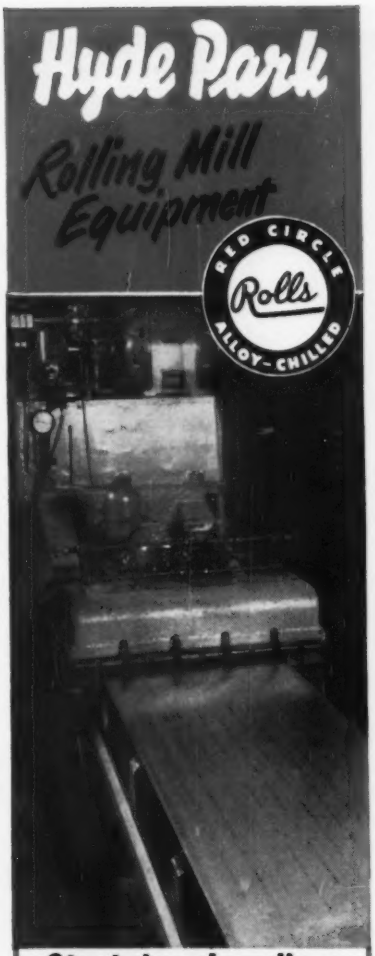
The IRON AGE is vitally interested in the U. S.'s barter program swapping some of our surplus farm products for less perishable metals and minerals for stockpiling.

Now and then we drop in on the Commodity Credit Corporation, the arm of the Agricultural Dept., to get the word right from the top.

Here's the latest for TV nibblers, or just anyone with crackers:

"Until further notice, CCC-owned cheddar cheese will not be available for export under barter acceptance after November 30, 1959."

But before you cheesers start celebrating—"This action is taken in view of the probability that CCC will increase its sales of cheese for dollars."



Stretcher Levellers

Complete range of stretching capacities from 150 to 750 tons, for levelling ferrous and non-ferrous sheets in sizes up to 120" wide x 500" long.

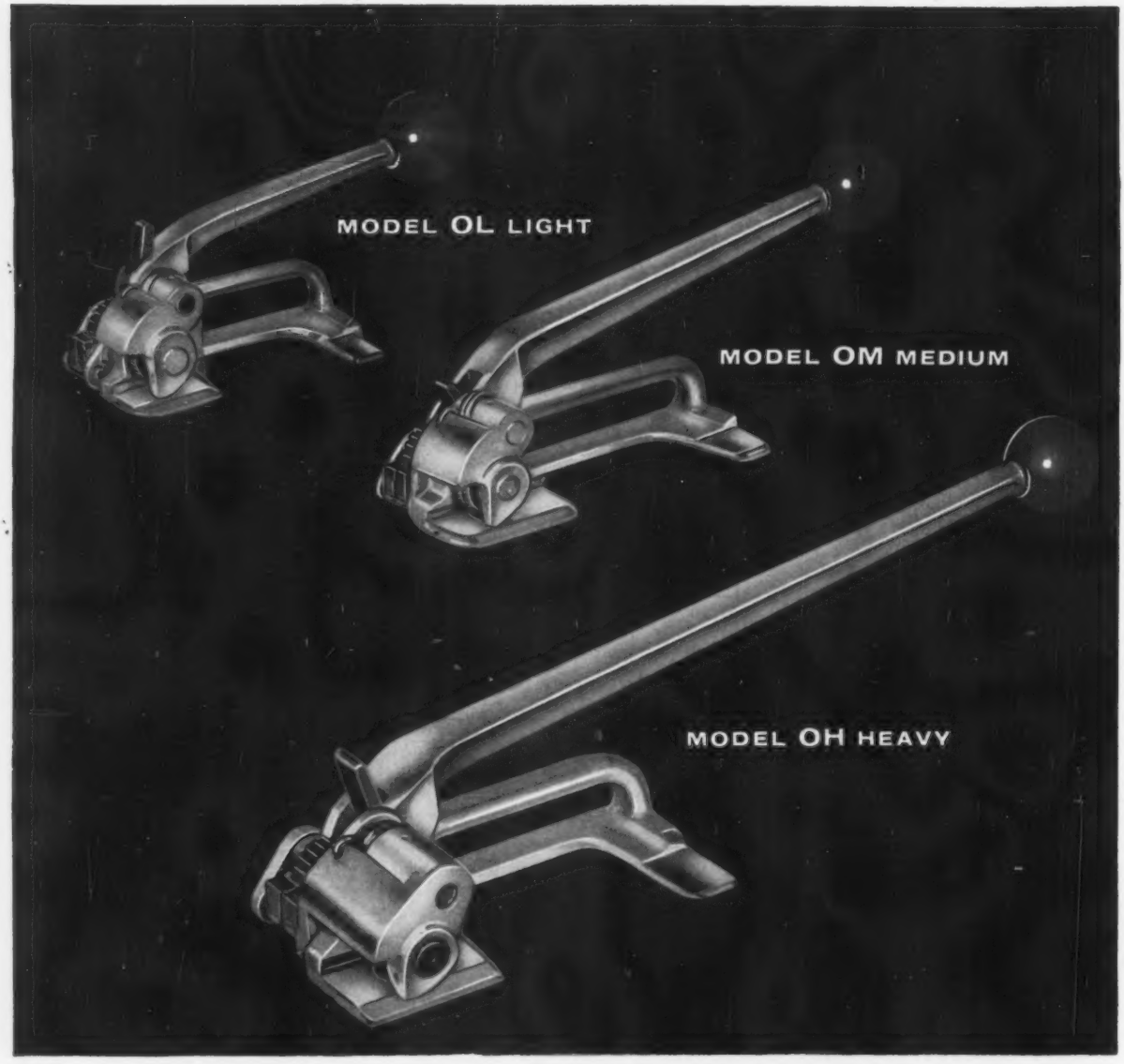
Speeds and length of "stretch" to meet all requirements.

Adaptable for automatic cycling.

Bar Mills • Merchant Mills • Sheet and Strip Mills • Pinion Stands
Roller Tables • Reduction Drives
Stretcher Levellers • Roll Lathes • Guillotine Shears
Special Machinery • Sheet Mill Shears • Machine Work

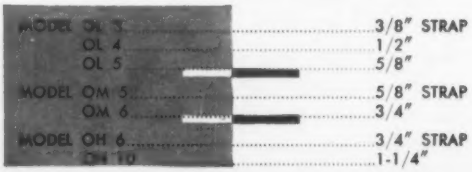
Hyde Park
FOUNDRY and MACHINE CO.
HYDE PARK
Westmoreland County, Pa.

Rolls
Rolling Mill Equipment
Gray Iron Castings



Select the tool *just right* for your needs from the STANLEY Line of "O" Tighteners

For tensioning steel strapping with maximum efficiency no matter what type, size, weight or shape your product or package is. The Stanley "O" Tightener is lightweight, sturdy, versatile; has unlimited takeup. Seals applied behind tensioning wheel eliminate strap waste.



Strapplication Data available from Stanley Steel Strapping, Division of The Stanley Works, Dept. L, 1317 Corbin Ave., New Britain, Conn.

INSURE IT-SECURE IT WITH STANLEY STEEL STRAPPING

STANLEY
REG. U.S. PAT. OFF.

AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works, New Britain, Conn.—hand tools • electric tools • builders hardware • industrial hardware • drapery hardware • automatic door controls • aluminum windows • stampings • springs • coatings • strip steel • steel strapping—made in 24 plants in the United States, Canada, England and Germany.

In Canada: Steel Strapping Division, The Stanley Works of Canada, Ltd., Hamilton, Ontario

COMING EXHIBITS

Plant Maintenance & Engineering Show — Jan. 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Show—Sept. 6-16, International Amphitheatre, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

MEETINGS

DECEMBER

Material Handling Institute, Inc.—Annual meeting, Dec. 13-16, Savoy-Hilton Hotel, New York. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.

JANUARY

Institute of Scrap Iron & Steel, Inc.—Annual convention, Jan. 10-13, Fontainebleau Hotel, Miami Beach, Fla. Institute headquarters, 1729 H St., N. W., Washington, D. C.

(Continued on P. 16)

"FASTER FROM FOSTER" service delivers any kind of pipe ...ANYWHERE

One call to any of Foster's six nationwide warehouses gets you immediate delivery of all the pipe you need, regardless of type, size or specification. L. B. Foster Company has made a specialty of supplying the "hard-to-get" sizes, the unusual walls, the extra large quantities.

Take advantage of "single-source" buying for all of your pipe requirements: Tested and Structural Steel Pipe in all sizes and specifications ⅛" thru 48", Stainless, Seamless Alloy and Pressure Pipe—Aluminum, Wrought Iron and PVC Pipe—complete lines of Valves, Fittings and Flanges.

For "complete package" shipments—for savings in time and money—try "Faster-From-Foster" service. Write, wire or phone your nearest Foster office.

L.B. FOSTER CO.

Pittsburgh 30, Pa. • New York 7, N.Y. • Chicago 4, Ill.
Houston 2, Texas • Los Angeles 5, Calif. • Atlanta 8, Ga.

Send for current Pipe Stock List No. IA-12.

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PETERSON
STEELS, INC.
THE 52100 HOUSE
UNION, NEW JERSEY · WETHERSFIELD, CONNECTICUT
DETROIT, MICHIGAN · MELROSE PARK, ILLINOIS

MEETINGS

(Continued from P. 15)

Society of Plastics Engineers, Inc.—Annual technical conference, Jan. 12-15, Conrad Hilton Hotel, Chicago. Society headquarters, 65 Prospect St., Stamford, Conn.

Society of Automotive Engineers, Inc.—Annual meeting, Jan. 12-16, The Sheraton-Cadillac and Statler Hotels, Detroit. Society headquarters, 485 Lexington Ave., New York.

Industrial Heating Equipment Assn., Inc.—Annual winter meeting, Jan. 18-19, Warwick Hotel, Philadelphia. Association headquarters, 1145 19th St., N. W., Washington, D. C.

Steel Shipping Container Institute, Inc.—Winter meeting, Jan. 19-20, St. Regis Hotel, New York. Institute headquarters, 600 Fifth Ave., New York.

Steel Plate Fabricators Assn.—Annual meeting, Jan. 21-22, Roosevelt Hotel, New Orleans, La. Association headquarters, 105 W. Madison St., Chicago.

Truck Trailers Mfrs. Assn.—Annual convention, Jan. 24-27, Hotel del Coronado, Coronado, Calif. Association headquarters, 710 Albee Bldg., Washington, D. C.

Cutting Tool Mfrs. Assn.—Annual meeting, Jan. 28, Harmonic Club, Detroit. Association headquarters, 416 Penobscott Bldg., Detroit.

Assn. of Steel Distributors, Inc.—Convention, Jan. 30-Feb. 6, El Mirador Hotel, Palm Springs, Calif. Association headquarters, 29 Broadway, New York 6, N. Y.

American Institute of Electrical Engineers—Winter general meeting, Jan. 31-Feb. 5, Hotel Statler, New York, Institute headquarters, 33 W. 39th St., New York 18, N. Y.

Cleaner, cooler operation . . . less maintenance . . . longer, trouble-free life

HERE'S WHY: Ordinary d-c motor ventilation systems draw air in at the commutator end, contaminate windings by drawing carbon dust from commutator brush wear *into* the machine. In the new Life-Line® "H," this air flow is reversed. Air and carbon dust are expelled at commutator end . . . assuring cleaner, cooler windings . . . longer motor life . . . less maintenance.

Plus . . . these other important advantages .....

YOU CAN BE SURE...IF IT'S Westinghouse

These exclusive features of the new Westinghouse Life-Line H d-c motor guarantee top performance . . . longer, trouble-free life

TEN TIMES LONGER INSULATION LIFE . . . New silicone insulation in Westinghouse Life-Line® "H" d-c motors and generators stands up under temperatures which turn ordinary insulation to a cinder. High-temperature silicone insulation is used with the full complement of iron and copper required for low Class B temperature. Result: Life-Line "H" shrugs off emergency overloads and abnormal ambients to keep production rolling, maintenance down.

GREATER PROTECTION . . . most complete and advanced protection available in dripproof industrial d-c machines. Elimination of uncovered side openings . . . heavy, cast end brackets . . . effective seals throughout . . . all combine to provide outstanding resistance to liquids, vapors and dirt. This means longer life with greater reliability . . . minimum maintenance under all operating conditions.

FASTEST RESPONSE . . . 35 per cent increase in commutating ability . . . up to 55 per cent lower mechanical inertia . . . and up to 30 per cent reduction in electrical inertia mean that the new Westinghouse Life-Line "H" d-c motor provides the fastest acceleration, quickest reversing and closest speed regulation. This means more production, better product quality, minimum complexity of control.

SIMPLIFIED MAINTENANCE . . . With the new Life-Line "H," maintenance is not only substantially reduced but periodic inspections are also greatly simplified. For example: as shown above, Uniforce brushholder fingers lock out . . . brushes can be inspected or changed with one hand. And Uniforce tension remains constant throughout brush life . . . no need to adjust pressure as brushes wear.

For information about the ways you can profitably put the new Life-Line "H" motor to work, contact your nearby Westinghouse representative. Or, write Westinghouse Electric Corporation, P. O. Box 868, 3 Gateway Center, Pittsburgh 30, Pa. JI-22122

YOU CAN BE SURE...IF IT'S Westinghouse

ONE important feature of automatic production is **the storage of shape in dies.** This is also the basis of closed die forging—"drop forging". **Chambersburg,** pioneer builder of equipment for making drop forgings, today builds tools that will shape forgeable materials to close tolerances by a combination of carefully designed die configurations, with precisely controlled forging blows and a fixed pattern of mechanized stock manipulation. When used with complementary shearing, heating, and trimming equipment, **fully automatic or semi-automatic production lines** are created which are capable of **increased output at lower costs.**

CHAMBERSBURG ENGINEERING CO.
CHAMBERSBURG • PENNSYLVANIA

A new publication, "The Automatic Production of Forgings in Closed Dies" provides the latest information on how to adapt these new developments to your drop forging operations. Write today for Bulletin 87-L-9.

CHAMBERSBURG

"THE HAMMER BUILDERS"
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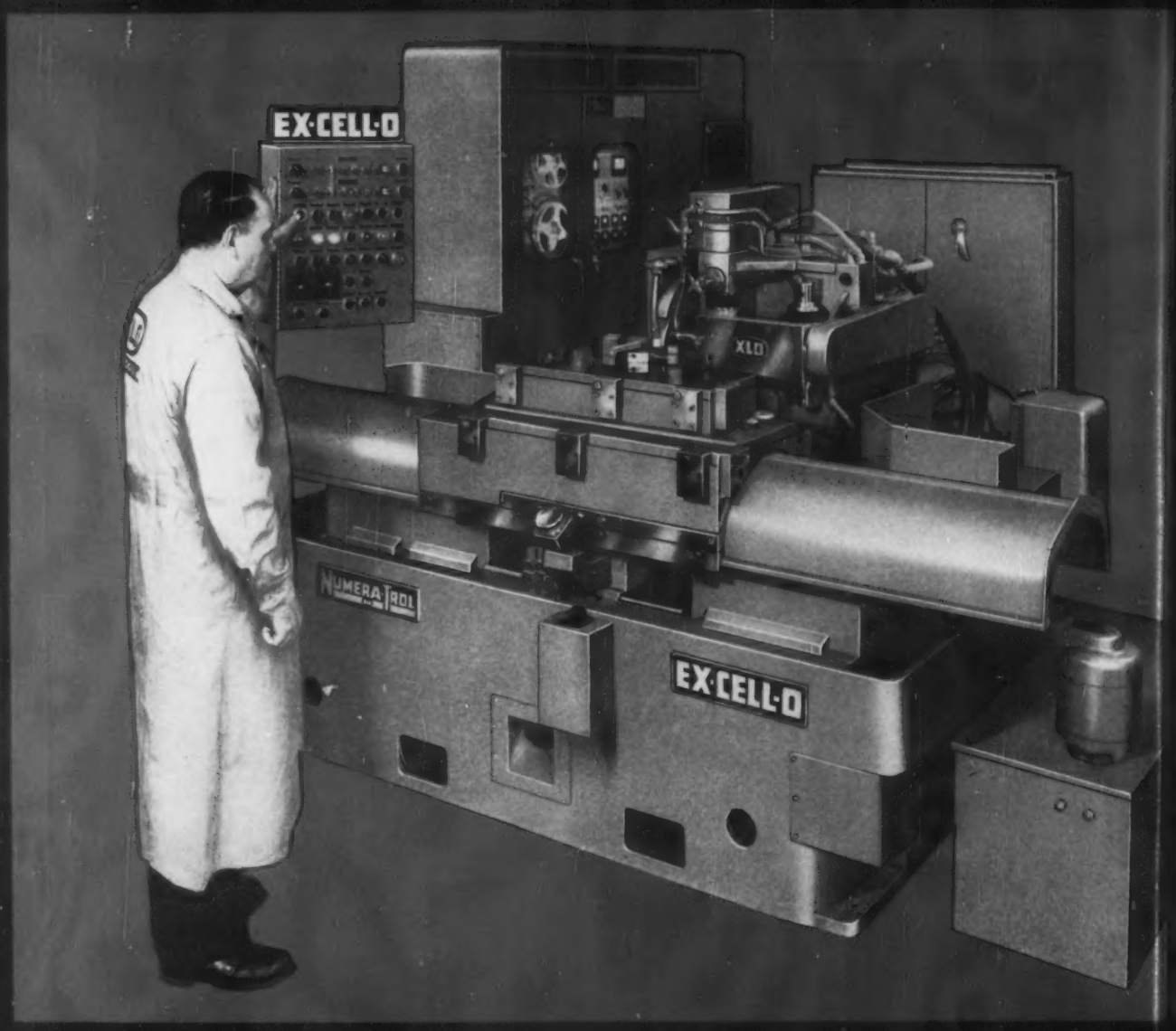
Designers and Manufacturers of
THE IMPACTER



TOLERANCES IN MILLIONTHS . wit

Plus versatility—
Interchangeable Units
for tape-controlled
Grinding, Turning
and Boring

SPACE-AGE ACCURACY—**The Standard 922 Contouring Machine's main slide and cross slide are controllable in increments of .000025″ automatically or manually. Dial the dimension, from .000025″ to .10″, and the main slide or cross slide of this two-axis machine advances or retracts by that amount—exactly!**

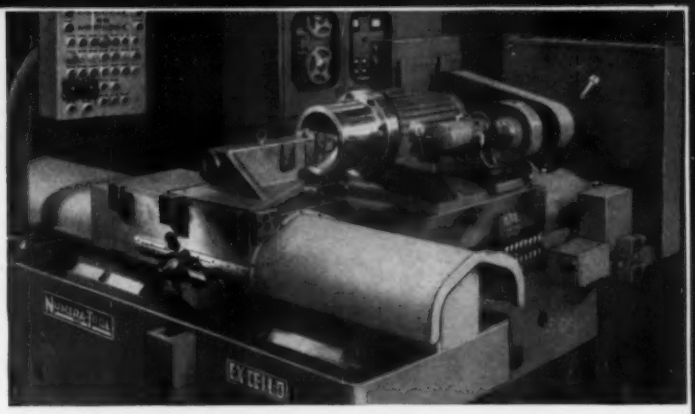
ECONOMY, VERSATILITY—**Building-block construction permits changing in minutes from a precision grinding assembly to a precision turning-boring unit. Unitized design adds versatility, cuts downtime.**

FULLY TAPE-CONTROLLED—**Used with high-performance pulse data input, the Standard 922 provides fully automatic turning, boring and grinding, plus wheel dressing and dressing compensation.**

TOMORROW'S MACHINES, TODAY—**The Standard 922 is the latest in a line of Numera-Trol Machines performance-proved in customers' plants. Others include Precision Milling and Grinding Machines for machining turbine blades, small cams and other prototypes and production parts.**

Standard Numera-Trol 922 equipped with grinding unit for precision templet grinding. Grinding assembly is easily interchangeable with boring and turning unit for accurate contouring operations.

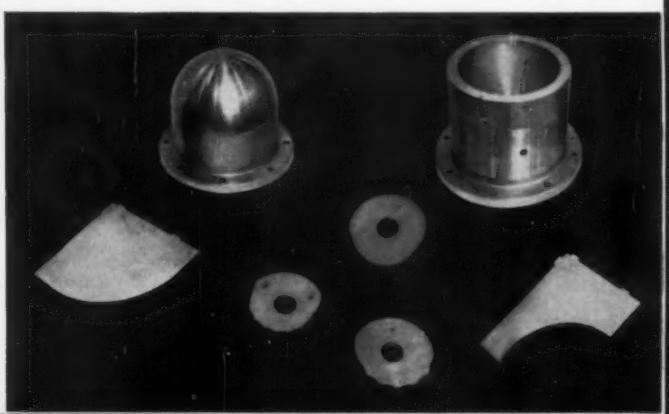
Machine is equipped for contouring by mounting boring and turning unit on main slide and tool holder on cross slide. Spindle speeds are automatically varied to maintain constant cutting speeds.



By setting dial and pressing button either slide can be moved in increments ranging from .000025" to .10" with total movement of 18" on main slide and 26" on cross slide.

Operation is monitored by electronic "Nixie" counting tubes and by direct-reading optical vernier. This mechanical and electronic read-out combination gives "closed loop" accuracy control during all operations.

Numera-Trol Contouring Machine simplifies production of parts with complex contours, ends need for blueprints and models, permits fabrication of prototypes and production parts directly from designer's mathematical directions.



. . . with the world's most accurate production machine tool!

EX-CELL-O NUMERA-TROL

59-71

FREE— NUMERICAL CONTROL GUIDEBOOK

"A Guidebook to Numerically Controlled Machine Tools," a valuable addition to your technical reference library, is available without cost from your local representative, or by writing direct to Ex-Cell-O.

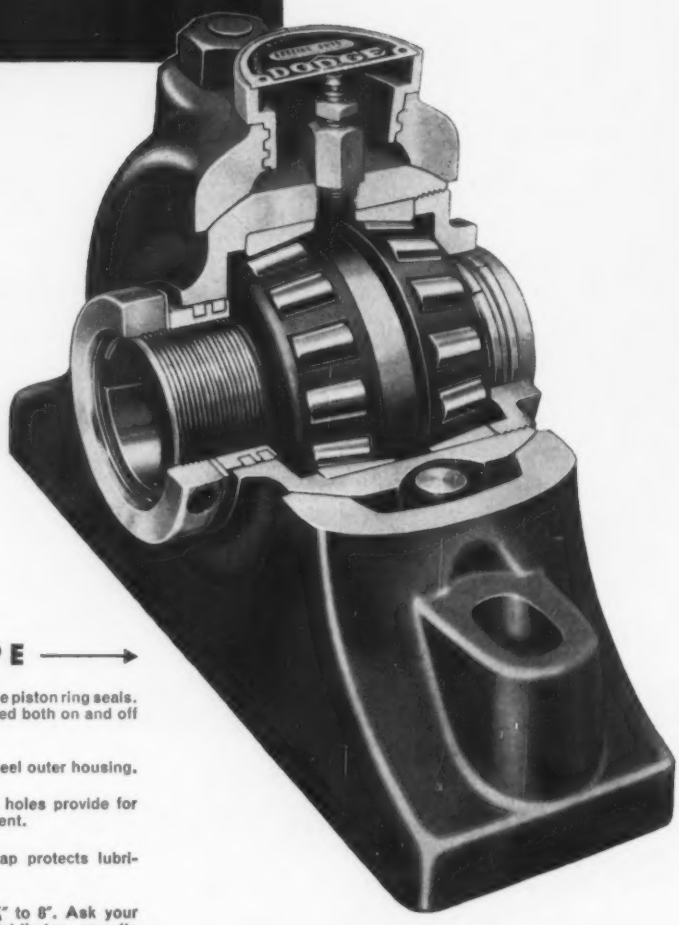
XLO EX-CELL-O FOR PRECISION

EX-CELL-O CORPORATION Machinery Division
DETROIT 32, MICHIGAN

EX-CELL-O PRECISION PRODUCTS INCLUDE: MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • THREAD AND GROOVE GAGES • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

DODGE PILLOW BLOCKS WITH TIMKEN BEARINGS

America's super-quality line—with a 35 year record of keeping performance *up* and costs *down!* Five types—to fit practically any service condition. All assembled, adjusted, lubricated and *sealed* at the factory for precision performance—long life—dependability.



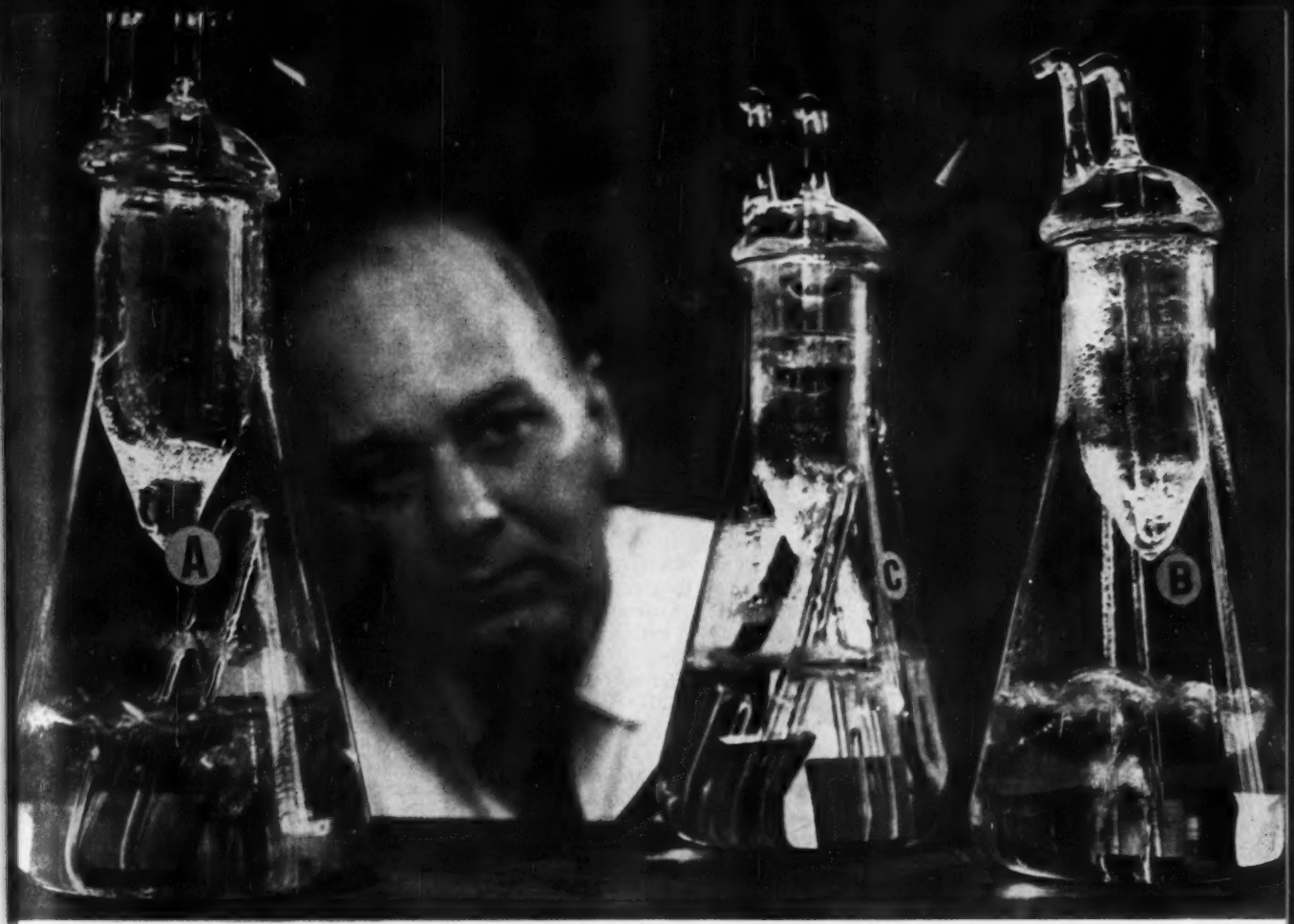
SPECIAL DUTY TYPE →

- Designed for extreme precision and high load capacities.
- Fully self-aligning.
- Special Duplex Timken Roller Bearing with tapered bore.
- Split tapered sleeve with straight cylindrical bore extends through entire length of housing.
- Easy to mount or demount. Adapter nut (or collar) clamps adapter sleeve to shaft with extreme firmness.
- Automotive type piston ring seals. Bearing is sealed both on and off the shaft.
- Rugged semisteel outer housing.
- Elongated bolt holes provide for lateral adjustment.
- Special dust cap protects lubrication fitting.
- Shaft sizes 1¾" to 8". Ask your local Dodge Distributor—or write us for Bulletin A670 giving complete technical data on America's most complete line of mounted bearings.

DODGE MANUFACTURING CORPORATION, 800 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

DODGE
of Mishawaka, Ind.



Here, boiling nitric acid is used to evaluate the corrosion resistance of Jessop stainless steel plate.

"How Jessop Tests Stainless Steel in Boiling Nitric Acid"

L. W. Cooper, Chief Metallurgist

"From experience, our customers know this is a fact: Specify Jessop for specialty steels . . . and then relax! Of the many reasons *why* this is true, here's one . . .

"In evaluating corrosion resistance, one of the procedures we use is the ASTM boiling nitric acid test. Standard and simple? Yes. But expert *evaluation* is of great importance to the customer. That's why, at Jessop, a top metallurgist closely supervises each of the five 48-hour test periods.

"*Overly cautious?* Because we're overly cautious in *every* phase of steel production and quality control, Jessop has earned the reputation for producing specialty steels tailor-made to the most exacting specs—*Specify Jessop . . . and then relax!*"

Checking the grain size of tool steel, this Jessop metallurgist uses a microscope with a camera attachment. VMA 6787

Green River Steel Corporation
Jessop Steel of Canada, Ltd.
Jessop Steel International Corporation
Steel Warehousing Corporation, Chicago

JESSOP
STEEL COMPANY
Washington, Pennsylvania

Stainless, alloy, tool, cast-to-shape, clad, and forging steels, ground flat stock and other specialty steels

1959

The Day Maximation Began

In seeking ways to increase efficiency, production men in the metalworking industry have found elimination of hidden machine tool costs through the use of proper filtration equipment a virtual guarantee of maximum output and economy. This method of obtaining increased production rates is known as *maximation*. Although today, it is one of the most significant factors in determining metalworking profit ratios, the maximation theory and its initial applications were actually developed more than 20 years ago.

HOW MAXIMATION STARTED

A number of months after inspection and delivery of several thousand piston rings to an airplane engine plant, the manufacturer was told that the rings were unsatisfactory and would be returned. Metal particles in the coolant apparently had adhered to the rings during the lapping process and the original high polish finish on the inside of the rings was pitted and chipped on removal from storage. About this time, engineers from the U. S. Hoffman Machinery Corp. were pioneering in research and development of dry cleaning principles for the removal of metal from kerosene coolants. Asked to provide a solution to the problem, they designed a pressure filter system for the clarification of coolants.

THEN AND NOW

This first filtration equipment by Hoffman was a fantastic complex of pipes and valves. But it did a fine job of bringing clean coolant to the work. A few months later, Fafnir Bearing asked for 2 pressure filters "just like the original." From these pioneering concepts have come Hoffman's modern equipment. Today, Fafnir Bearing employs more than a dozen advanced Hoffman individual and central filtration systems.

At Fafnir and in thousands of other plants employing filtration, coolants and lubricants once contaminated by metallic chips, abrasives and other extraneous dirt are no longer responsible for high production, maintenance and costs, as well as premature obsolesence. Through proper filtration, machines originally designed and tested for peak efficiency with clean lubricating oil and clean coolants can now operate at or near rated capacity. Filtration has made it possible to obtain a 30 to 50% savings in grinding wheels, honing stones, broaches, cutting and other edge tools in addition to providing numerous collateral benefits and advantages.

TYPES OF FILTRATION EQUIPMENT

In making recommendations for solving filtration problems, Hoffman engineers draw on a complete line of equipment which includes;

PRESSURE FILTERS—This type of filter gives up to 100% clarity and is widely used with grinding, cutting and honing oils as well as water soluble oil coolants where finest clarity is consistently required. Easily adapted for large groups of machines. Unlimited coolant capacity.

View of a central pressure filter system at the Plymouth Mound Road Engine Plant of the Chrysler Corp. This system serves a wet grinding department.

FLOTATION EQUIPMENT—Automatic flotation units increase the productivity of machine tools and eliminate down time for sump cleaning. Provide excellent results in steel and cast iron applications with efficiencies of over 98% in one pass. Handles flow rates from 40 to 1500 gpm.

MAGNAFLOW SEPARATORS—Fully automatic and self-cleaning, Hoffman Magnaflo Separators remove from 75% to 90% ferrous solids from cutting oils and water soluble coolants. Flow rate from 40 to 1,000 gpm.

VACU-MATIC FILTERS — For continuous filtering of coolants from *individual* machine tools. Provides unusually high flow rates in continuous filtration of water soluble coolants. Completely automatic and self cleaning. Flow rates range from 40 to 2,500 gpm.

DISC FILTERS — Filter oils containing finely divided particles. Geared for continuous flow.

SUCTION FILTERS—Provide fine filtration on small flow rates for lapping, microhoning, grinding and similar operations. Cap.5-60 gpm.

SUMMING UP

Proper filtration delivering clean coolant makes it possible to achieve maximation with these savings.

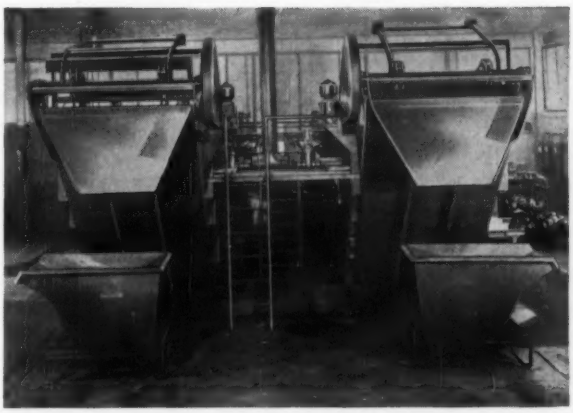
- Greatly reduced down time
- Higher speeds
- Improved finishes—fewer rejects
- Longer useful life of coolants
- Life of edge tools extended
- More sustained tolerances
- Fewer stoppages, adjustments
- Scrap loss considerably reduced
- Elimination of motor pumps
- Curtails bacteria and rancidity
- Saves 25 to 50% in grinding wheels, honing stones, broaches, individual machine tools.

To check on the unlimited industrial applications of individual tool and complete central filtration systems, send for free bulletins and case histories on equipment described above.

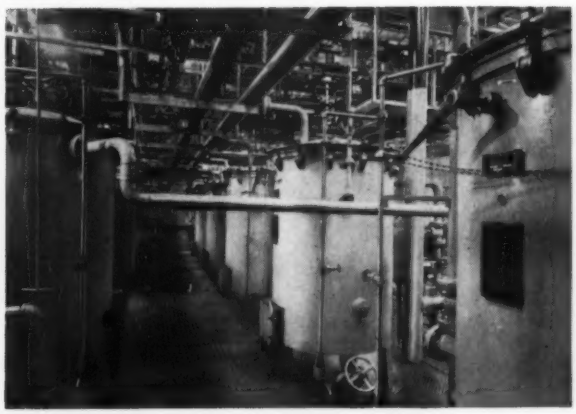
Please write:
U.S. Hoffman Machinery Corp.
Dept. LR, Industrial Filtration Div.
Thompson Road—Plant #1
Syracuse, New York

Today's high production costs dictate a good hard look at metalworking tools and techniques—make a reduction in operating expenditures essential to increased profit margins. Here are typical examples of companies which have obtained maximum production from machine tools by eliminating unnecessary and often hidden expenses through the use of Hoffman filtration equipment.

They're Beating High Machine Tool Costs and Obsolesence



A Hoffman Central Flotation System serving 28 grinding machines at an International Harvester plant. The coolant serving the sickle grinding department is a water-base soluble oil.



A Hoffman Central Filtration System consisting of 9 Hoffman Pressure Filters, Model I-80S, each equipped with Hoffman Dual Magnaflo Plates—with a flow rate of 150 gpm and sludge collector conveyor—(Magnetic separator), are shown at the plant of a leading automotive and aircraft accessory manufacturer.

This system enabled International Harvester to make the following savings:

Cleaning of coolant trenches completely eliminated —savings of $10,000 annually.

Trucking costs for the removal of sludge to a disposal point reduced 65.5%. Saves $8,122.50 annually.

Cost of grinding wheels reduced 47.4% — saves $65,477.19 annually.

Production per grinding wheel increased 134%.

Cost for wheel-change-over reduced 57.3%.

Adding these and others, the total savings for this particular year were significant.

The following tabulation is a percentage breakdown of actual savings made with this Hoffman Central Filtration System equipped with a Magnetic Separator and sludge collector conveyor for automatic removal of sludge collected by filters, magnetic plates and gravity settling.

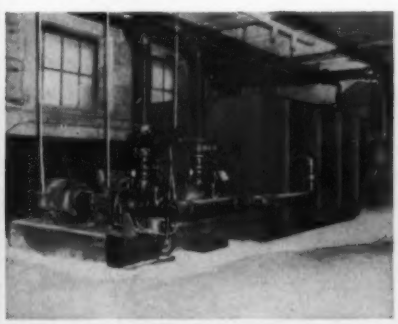
Grinding Oil 2.5%

Diamonds—Grinding Wheels 43.4%

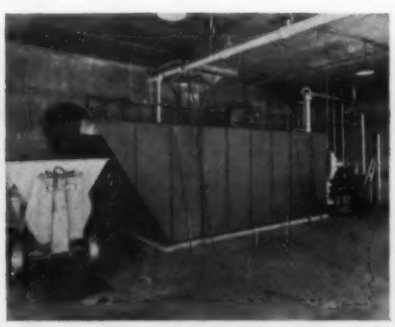
Production scrap (resulting from improved quality of product) 32.5%

Labor to operate system and actual production labor @ $2.00 per hour 21.6%

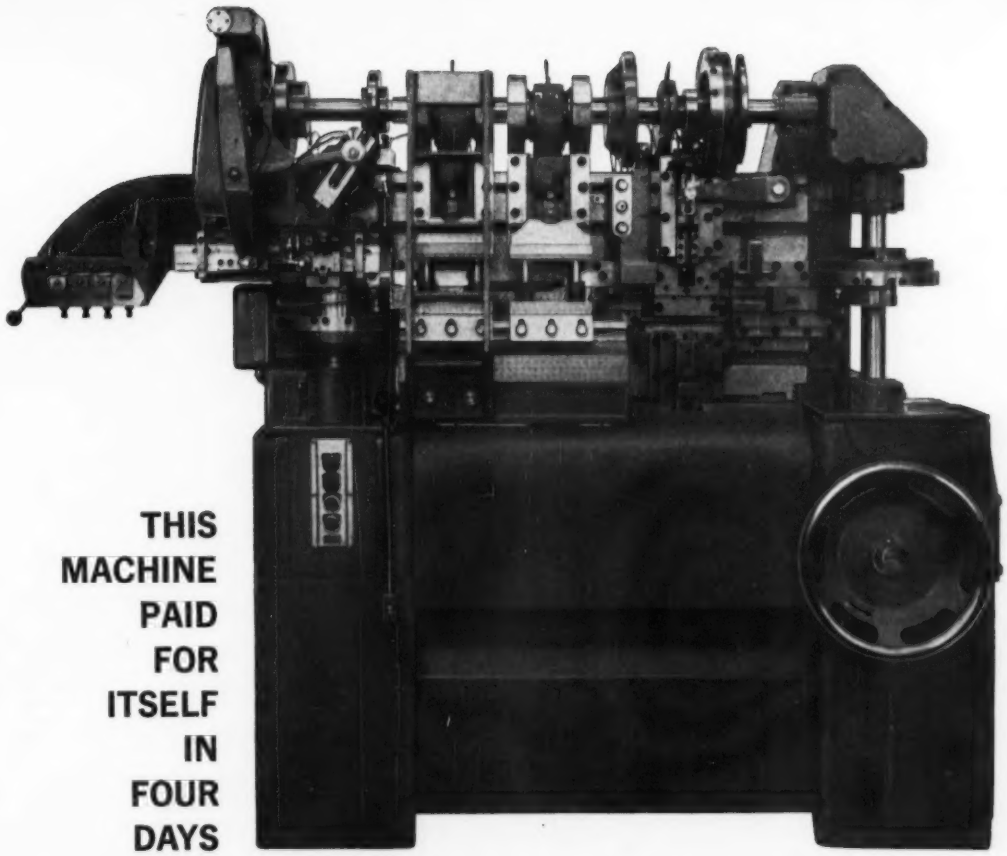
A Hoffman Vac-80 Vacu-Matic Filter is shown installed on a Norton 30" diameter stepped-wheel grinder for grinding transmission shafts at the Syracuse plant of a large automotive manufacturer. Most Norton grinders are equipped with Hoffman Vacu-Matic filters when shipped.



At the Union Twist Drill Co. in Athol, Massachusetts, a Hoffman Magnaflo Separator removes metal particles from oils and coolants to solve numerous clarification problems. Result—many money-saving improvements in manufacturing technology and product quality.

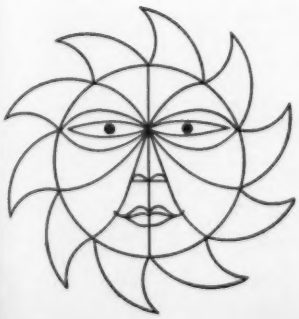


A money-saving Hoffman Flotation Unit at the Fafnir Bearing Company. It is designed for plant wide distribution of water-base coolant. The company credits Hoffman systems for great improvement in critical finish grinding operations on bearing races.



THIS MACHINE PAID FOR ITSELF IN FOUR DAYS

The high-precision enameling wiper die shown below, has 26 critical dimensions. Previous production methods at the General Electric Industrial Heating Department employed either 5 or 6 standard OBI presses. Today, General Electric is producing this part **FOUR TIMES AS FAST—USING ONLY ONE TORRINGTON V-82 VERTI-SLIDE—AND SAVING $13,500 ON A SINGLE PRODUCTION RUN TOTALING 3 DAYS OF OPERATION.** This amazing new vertical four-slide machine promises a genuine revolution in high-speed, high-precision, low-cost production of just about everything in strip or wire that is now produced on progressively tooled forming presses or horizontal four-slide machines. Write or call today for complete technical data—or a Torrington sales engineer.



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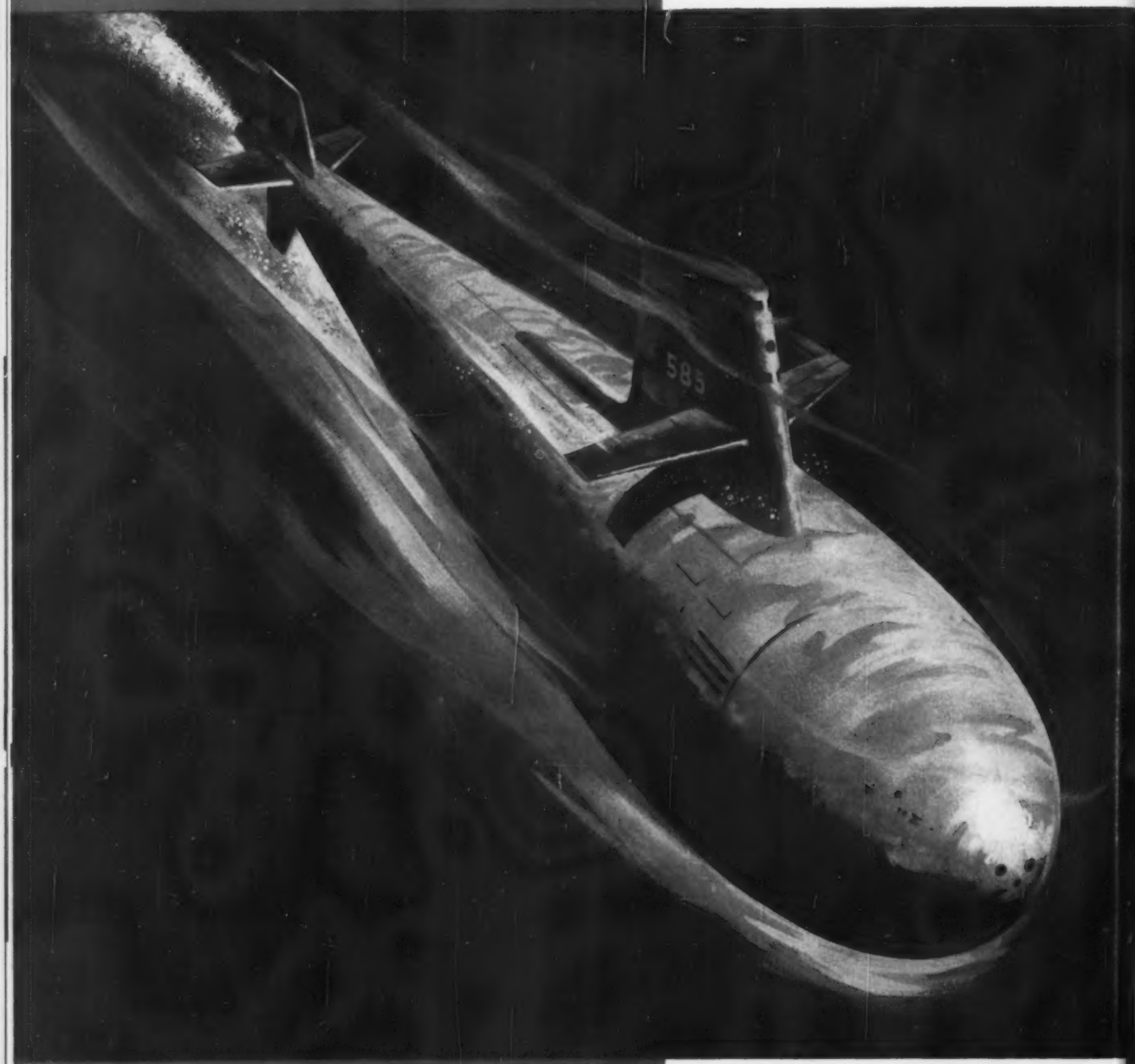

NEW LOOK IN NUCLEAR SUBS . . . The Navy's new submarine Skipjack, built by General Dynamics Corporation's Electric Boat Division in Groton, Connecticut, features a revolutionary blimp-shaped hull and diving planes on the sail (formerly known as the conning tower). Although her speed is classified, Skipjack is the fastest of the A-Subs.

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Steel and Tubes Division

STEEL & TUBES U.S. PIPE DIVISION

BURLINGTON, NEW JERSEY

SALES OFFICES: BURLINGTON, BOSTON, BIRMINGHAM, CHICAGO, CLEVELAND, LOS ANGELES, NEW YORK, PITTSBURGH, SAN FRANCISCO, ST. LOUIS

"HYDROFORGED" FINE-GRAIN STAINLESS PIPE FOR THE NUCLEAR NAVY*

THE PROCESS: The starting point is a high quality machined hollow billet made centrifugally which is cold expanded by hydrostatic pressures up to 50,000 PSI in specially designed massive metal dies. After "hydroforging", the pipe is given a recrystallizing anneal which results in the grain refinement characteristic of wrought stainless steel.

THE PRODUCT: After final machining of the O. D. and I. D. surfaces to 125 micro inch finish, the pipe is subjected to all the testing requirements of Military Specification MIL-T-18063A (Ships) which covers seamless austenitic steel tubes and pipe intended for radioactive system service. This specification includes: chemical analysis, tensile properties (for Type 304 stainless steel—75,000 PSI minimum tensile strength, 30,000 PSI minimum yield strength, 35% minimum elongation), expanding and flattening tests, hydrostatic pressure test, intergranular corrosion test, macro-etch, ultrasonic and liquid penetrant examination.

PIPE BEING ULTRASONICALLY TESTED IN ACCORDANCE WITH MILITARY SPECIFICATION MIL-T-18063A (Ships)

SIZE RANGE
DIAMETER – 8" through 28" O.D.
WALL – ½" to 4"
LENGTH – Up to 22 feet
TYPES OF STAINLESS
Austenitic grades, including E.L.C.

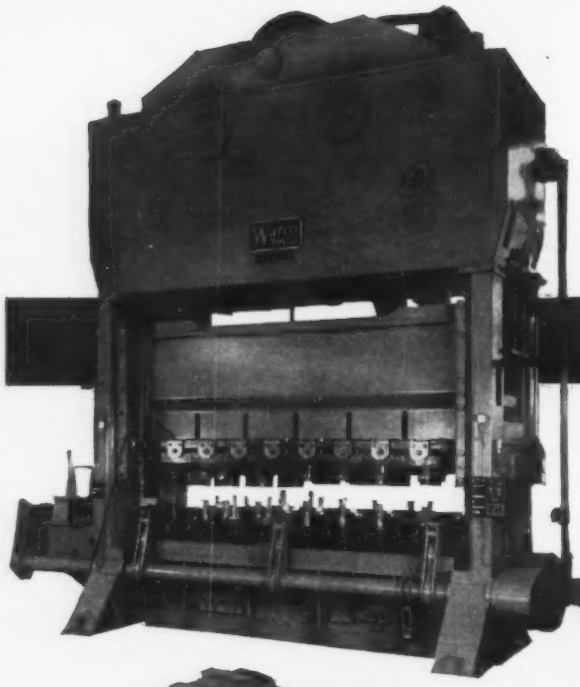
*** U. S. NAVY SERVICE APPLICATIONS FOR HYDROFORGED STAINLESS INCLUDE:**

Pipe for valve operating system reservoirs and primary water preheaters

Primary coolant piping for nuclear submarines and surface ships

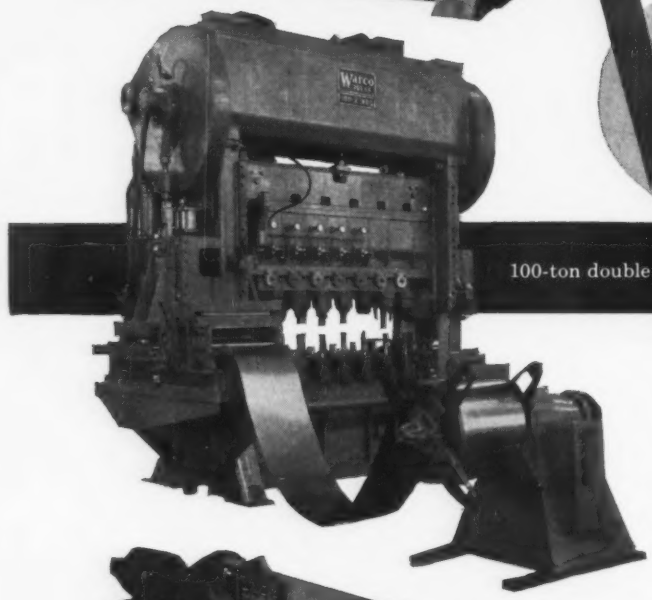
Seamless welding fitting stock for large diameter reactor piping systems for submarines and surface ships

Demineralizer shells



350-ton eccentric gear for automotive headlight housing.

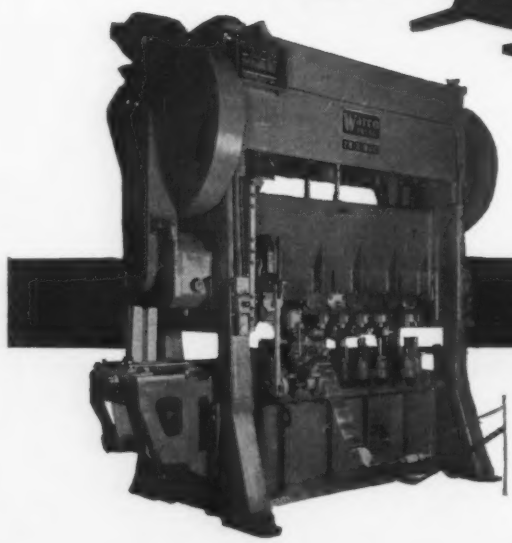
Warco®



100-ton double crank with outside blanking slide.

TRANSFER FEED PRESSES

To be absolutely sure you get modern . . . efficient . . . productive and profitable mechanical press operation . . . check with Warco engineers before you buy.



75-ton double crank for refrigeration parts.

The Federal Machine and Welder Company
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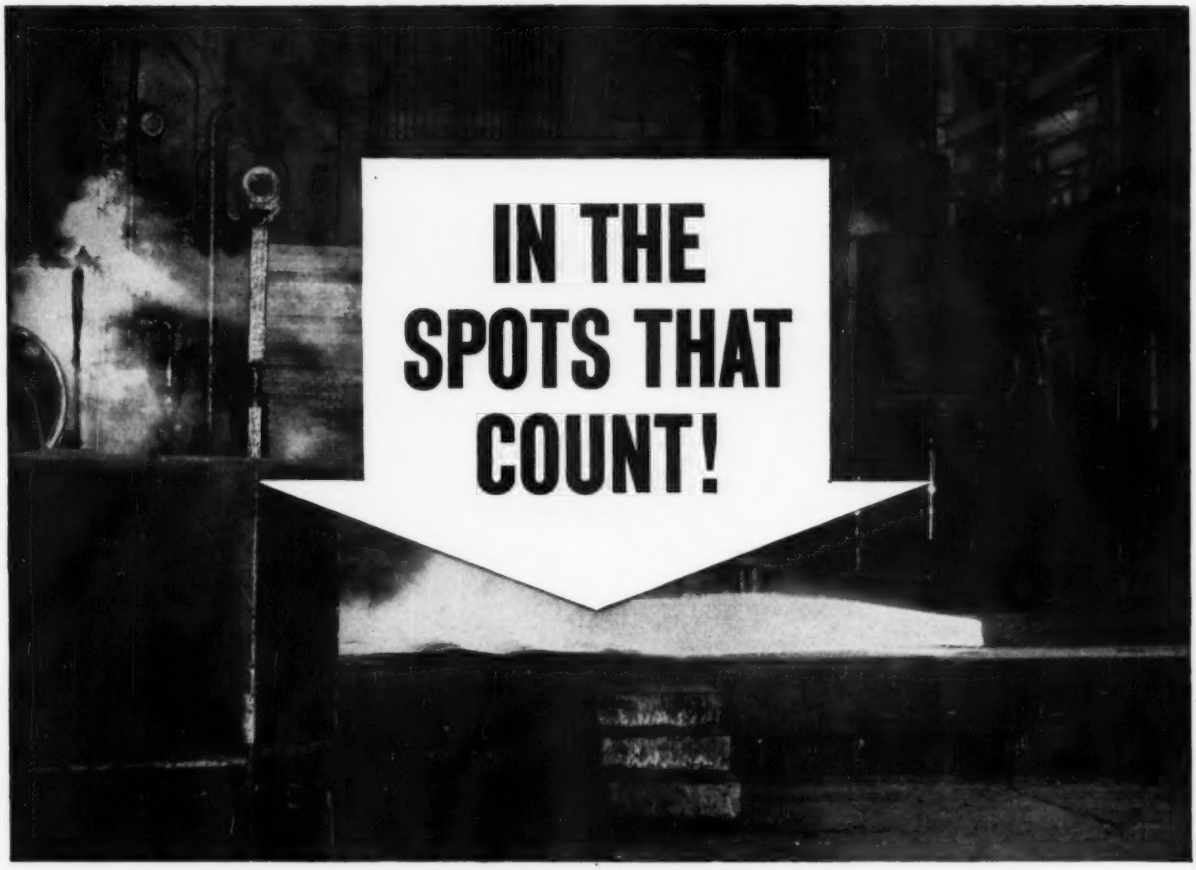
Warco® PRESSES



split-second control with Homestead® Operating Valves keeps steel plate rolling!

Solenoid-hydraulic pilot controlled 4" and 2½" Hydro-Cushion Homestead Operating Valves; and Lever-Sealed Hydraulic Stop Valves; 800 pounds working pressure.

Six days a week, twenty-four hours a day, 250 times an hour, the tilt tables and middle roll of an East Coast Plate Mill are exactly positioned without shock, and held without creepage, by Homestead Operating Valves. This precision control has permitted record-breaking rolling of the hot steel slabs into plate.

Through more than *three and one-half million* split-second rollings during the two years the 2½" and 4" Hydro-Cushion Homestead Operating Valves have been in service, not one shutdown has been required for valve maintenance! Performance records such as these, are assured by the protected seat and cushioning action of the Homestead Valves.

For any hydraulic control problem, there is a Homestead Operating Valve to meet your needs. Send today for Reference Book 39-6.

Please send Reference Book 39-6 and prices on all types of Homestead Operating Valves. 23

Name ..... Title .....

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HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. Box 23, Coraopolis, Pennsylvania

Here's why you save $60 in maintenance

Ordinary brakes need frequent adjustment . . .

Ordinary magnetic brakes require periodic adjustment to compensate for wear . . . industry average is once every two weeks. New Westinghouse SA brakes are completely self-adjusting . . . automatically adjust themselves *during* operation. Once they're installed, you never have to touch them. This means you save at least $60 per year per brake *in maintenance alone*. And that's not all . . .

a year with every Westinghouse SA brake

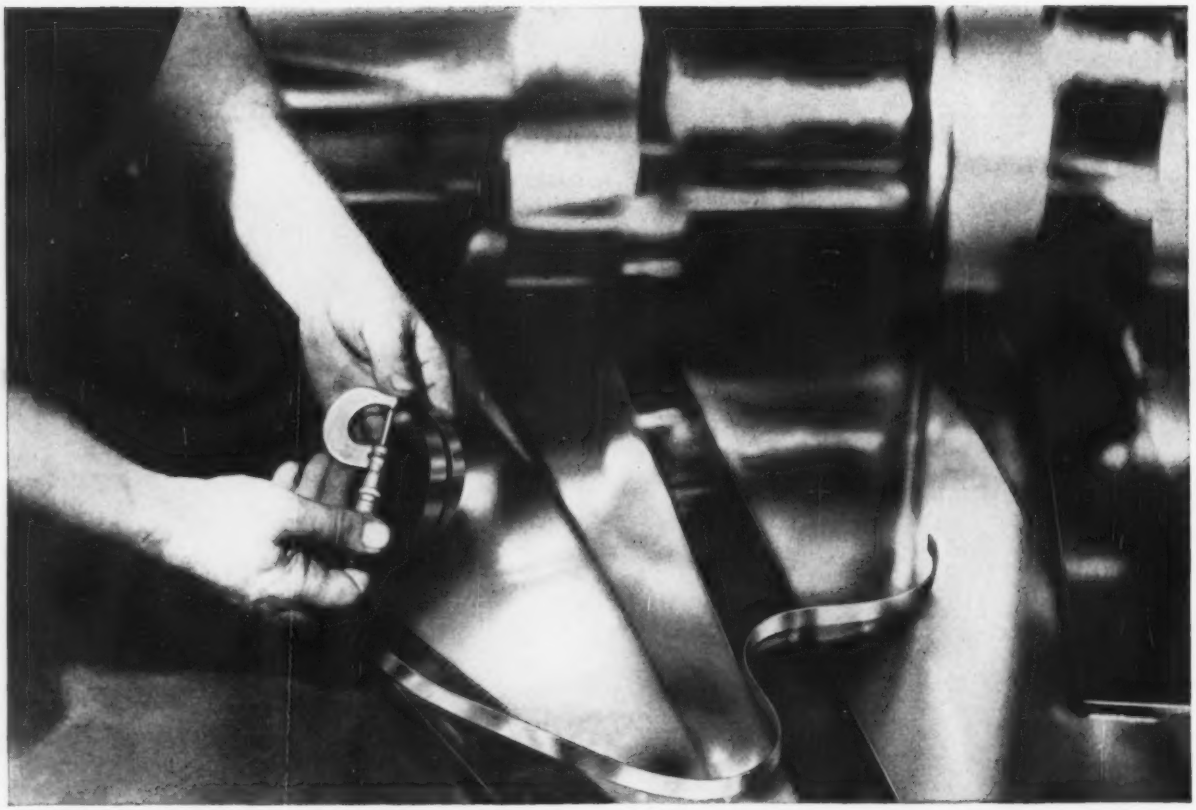
Westinghouse SA brakes adjust themselves... automatically

Westinghouse magnetic brakes also offer you these important benefits: 1) dust-tight enclosure which eliminates cleaning of dust, dirt and metal particles . . . 2) automatic self-alignment which substantially reduces installation time . . . 3) safe, sure protection against dragging shoe tips and uneven lining wear, eliminating costly replacements.

Ask your Westinghouse representative about the many ways this new brake can benefit you. Or, write Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pa. Ask for Booklet B-6548. J-22114

YOU CAN BE SURE...IF IT'S

Westinghouse



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UDDEHOLM Spring Steels

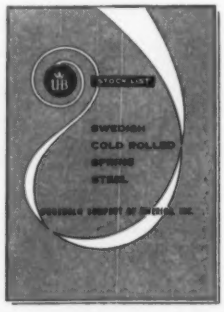
are quickly obtainable from warehouse stocks

Uddeholm Company of America, Inc. regularly maintains large stocks of tempered and annealed spring steels for rapid delivery to you. Large modern warehouses in New York, Cleveland and Los Angeles are set-up to provide almost any size, grade or quantity you may need. Choose from over 1000 sizes, from ⅛″ to 16¼″ wide, from .001″ to .125″ thick. You can obtain quickly . . . hardened, tempered, polished blued steels in such wide sizes as 6″ x .005″ or 12½″ x .016″ . . . standard grades SAE 1075, SAE 1095 or other analyses for special applications. . . all types of finishes such as Bright Blue, Straw Polished, and Scaleless Blue.

Modern slitting and edge finishing facilities can satisfy your needs, exactly!

Uddeholm Spring Steels have long been famous for their:

- Accuracy of Size—
- Uniformity of Hardness and Analysis—
- Better Flatness and Finish—
- Longer Fatigue Life—



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COLD ROLLED SPRING STEELS

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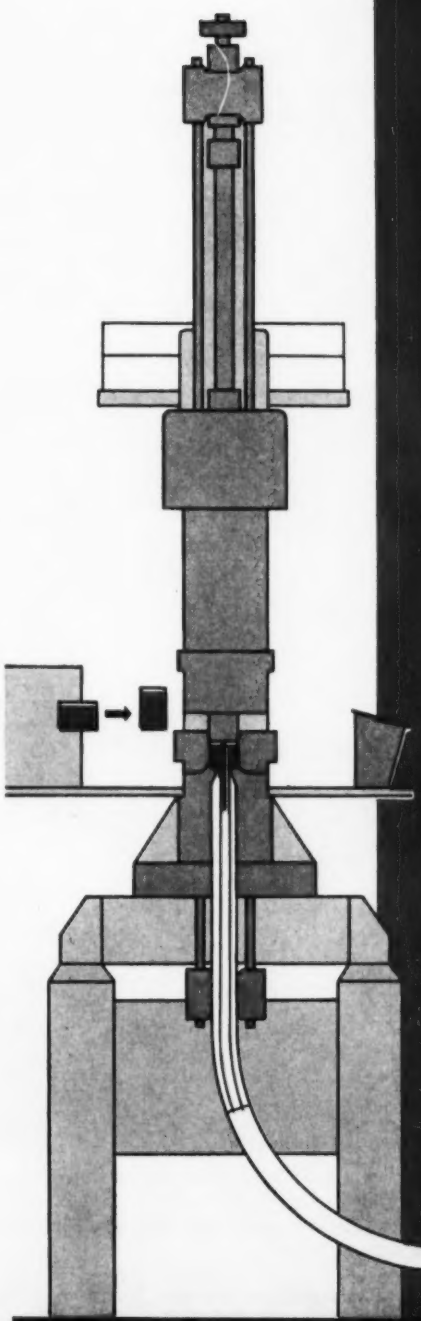
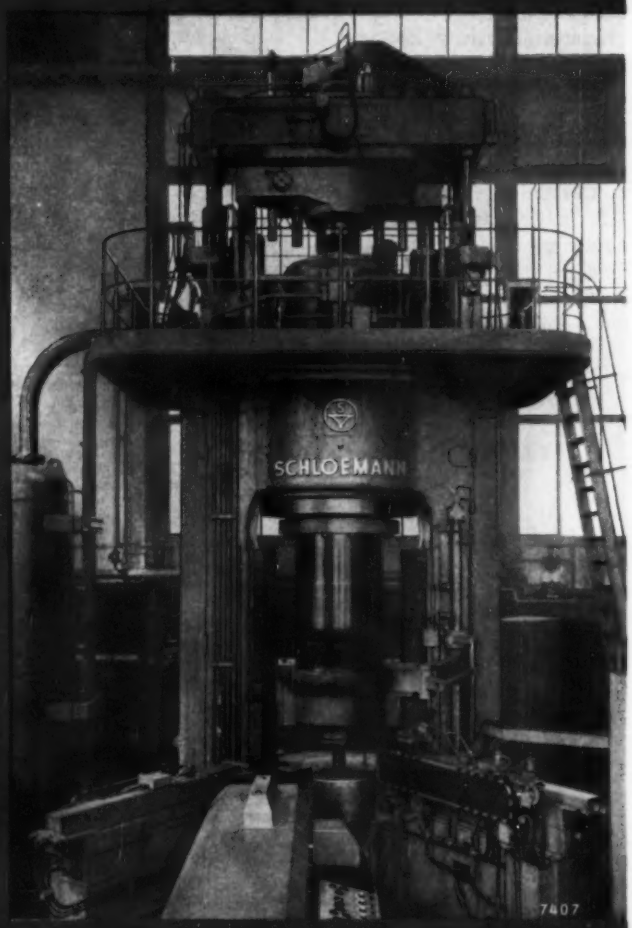
SCHLOEMANN

Extrusion Presses Automated





The fully automatic operating cycle of this vertical 1,375-ton tube and rod extrusion press also includes: billet charging; loading and removing the dummy, as well as the scavenging block; severing the butt, cutting and ejecting the extruded product; cooling mandrel, container, and die · Essential features of the press are covered by patents · Only one operator required · 21 vertical SCHLOEMANN extrusion presses equipped for manual or electro-hydraulic automatic control have been built within the past nine years · Latest SCHLOEMANN horizontal extrusion presses also feature fully automatic operating cycle.

FELLER ENGINEERING COMPANY 1190 Empire Building, Pittsburgh 22, Pa.

HOT AND COLD ROLLING MILLS • COUNTERBLOW HAMMERS • HYDRAULIC PRESSES

Don Chisholm solved a double problem at Split Ballbearing . . .

It all started with a torque tube bearing for one of the top priority missile guidance systems. Two kinds of trouble had developed during the manufacturing process and engineers at the Split Ballbearing Division of Miniature Precision Bearings, Inc., Lebanon, N. H., were in a hurry to get both of them straightened out.

First, in bore-grinding the inner race, about .010″ of stock had to be removed, but the tolerance specified was a microscopic ±.0001 and an eight microinch finish was mandatory. The bore-grinding wheel used wasn't up to requirements and the reject rate was excessive.

Second, in lapping the faces of both races, the wheels used were not producing the required five microinch finish, there was an imbalance between the amount of stock removed from the upper and lower surfaces . . . and, on top of that, the wheels themselves broke down too rapidly.

Bay State was called in and Abrasive Specialist Don Chisholm attacked the problem, working closely with Distributor Harold Domingue, Abrasives & Tools, Inc., Auburn, Mass. They not only cured both troubles and brought production up to the standards required . . . the people at Split Ballbearing were so delighted they asked Chisholm and Domingue to make a survey of every grinding operation in the plant. This led to fourteen other carefully considered recommendations.

Like Hal Domingue and Don Chisholm, the Bay State people in your area are trained specialists. Whether you have a single problem or a multitude of them, they're ready to apply experience, imagination and plain hard work. *Better grinding at lower cost . . . that is their business.*

Skill and experience play a vital part in maintaining the ultra-precise standards demanded by Split Ballbearing customers. Here, the company's senior machine operator, Emory Malloch, loads the fixture plate in the big production lapping machine with torque tube races.

Examining the precisely lapped finish on a pair of bearing races are Frank Orth (left), Chief Industrial Engineer at Split Ballbearing, and George R. Morin, Factory Manager.

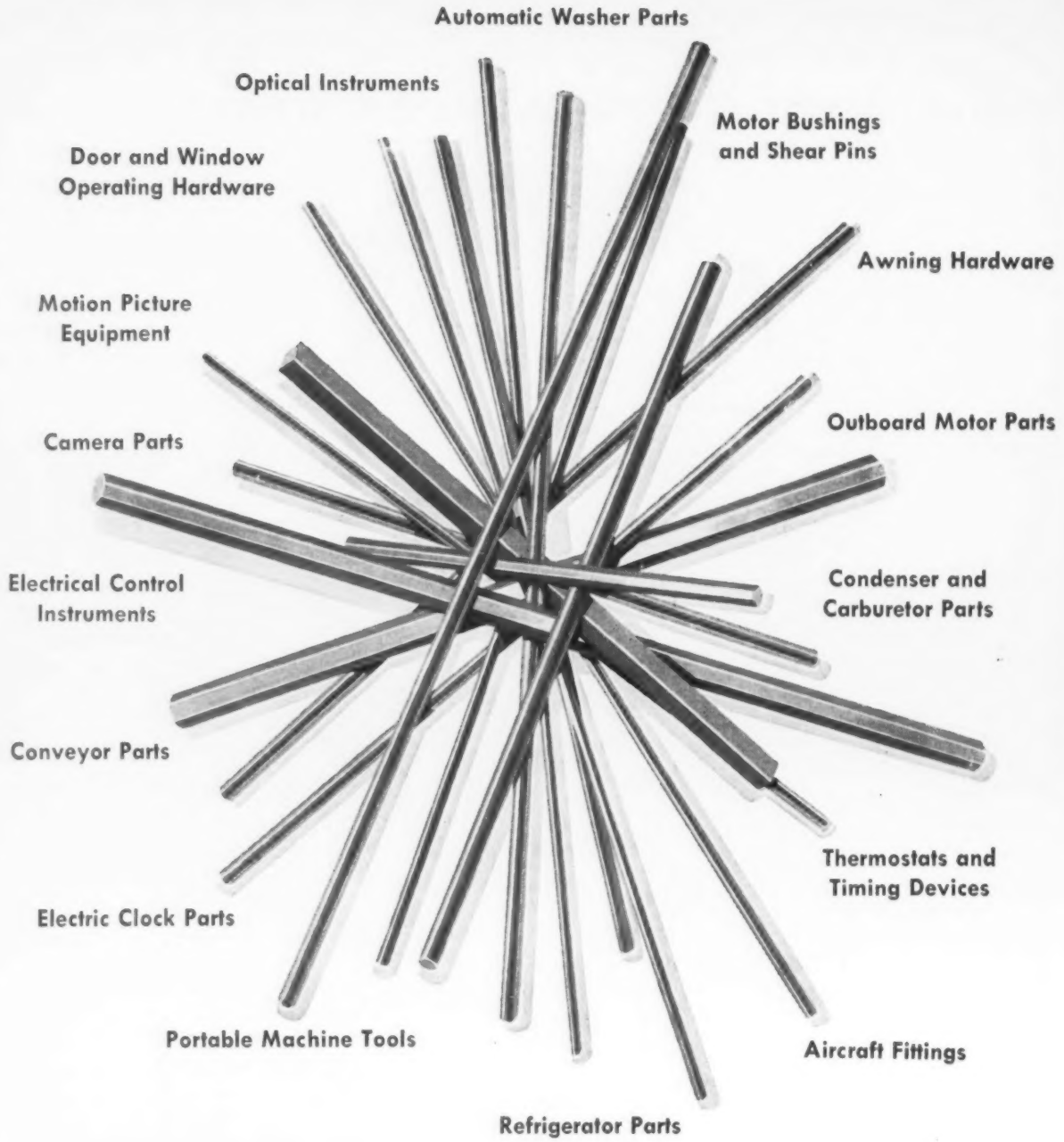
and they gave him 14 more!

Don Chisholm has built a formidable reputation for solving tricky abrasive problems. Prior to joining Bay State as an abrasive specialist, he spent 17 years as Abrasive & Tool Coordinator at General Electric's turbo-super-charger and jet engine plants where his experience was extremely varied since he had to use abrasives on unusual alloys as well as the general run of industrial metals.

BAY STATE ABRASIVES

BAY STATE WHEELS of PROGRESS

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh, Los Angeles. *Distributors:* All principal cities.



WHAT CAN YOU MAKE OUT OF THIS?

...anything from large ordnance parts to minute components for electrical clocks. Bridgeport Aluminum Screw Machine Stock combines high strength and excellent machineability, allowing cutting speeds well in excess of 700 surface feet per minute at maximum feeds and depths of cut. Aluminum Screw Stock reduces tooling costs and finishes beautifully, too. And remember to figure material costs on a basis of price per piece not price per pound. A pound of Bridgeport Aluminum will yield 3 times as many finished pieces as a pound of most other material.

Round and hex aluminum screw machine rod is available now for immediate delivery from Bridgeport Warehouses across the country. Call today for more information, or write direct to Dept. 2306, Bridgeport Brass Company, Bridgeport 2, Conn.

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Specialists in Metals from Aluminum to Zirconium

BRASS Bridgeport CO.

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Dann Goodson, *Manager Motor-Driven Compressor Sales, The Cooper-Bessemer Corporation, explains...*

How National Tube steps up production with oxygen

Lorain Works of National Tube Division, United States Steel Corporation, is increasing ingot output by injection of oxygen into open hearth furnaces. Introduced by lances extending through the roof down into the furnace, the oxygen speeds up production. It is fed directly into the metal in a volume of 28,000 cu. ft. per hour per furnace.

Another major use of oxygen at the Lorain Works is for hot bloom scarfing. The machine shown here removes seams and other defects, conditions blooms for rolling into top quality products. Entire operation is automatic, push-button controlled.

The 2000 hp Cooper-Bessemer Type JM Air Compressor, shown here, plays an important part in the manufacture of the oxygen used for these and other operations at the Lorain Works. This is a 4-stage unit, operating at 300 rpm with a discharge pressure of 1000 lbs. The plant was designed and built by American Messer Corporation.

Cooper-Bessemer can supply all types and sizes of reciprocating or centrifugal compressors, expansion engines and En-Tronic® controls for oxygen production.

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ENGINE OR MOTOR DRIVEN

Where secure holding power is needed most...

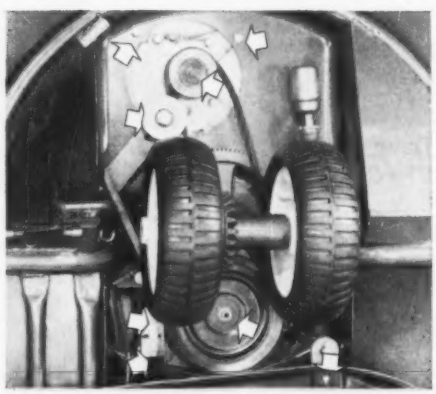
Users from coast to coast know about the quality construction of Roberton Twin Power Riding Mowers, made by Roberton Manufacturing Company, Chicago, Illinois.

Efficient riding mowers like these, constantly used to cut grasses of varying thickness and height, are subject to intense vibration. Yet their *two* power units are firmly held in place for long, dependable service by a total of 44 Republic Nylok Fasteners.

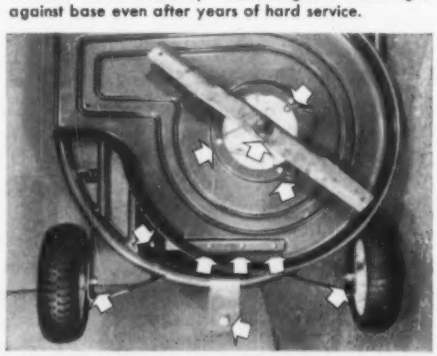
Republic Nylok Fasteners have a special nylon insert that assures positive locking at any position, even under severe shock, vibration, or tension. When the fastener is assembled, this nylon plug exerts pressure in a lateral direction, preventing all play, and utilizing the metal-to-metal contact of the opposing threads for locking.

Republic Nylok Fasteners provide maximum holding power under all conditions, whether seated or not; and they can be used repeatedly. One of their unique advantages is the "plastic memory" of the nylon plug—the tendency of the nylon to recover its original shape after assembly. This "growth" into the threads actually results in a tighter locking action, after a period of time, than when the fastener was first assembled.

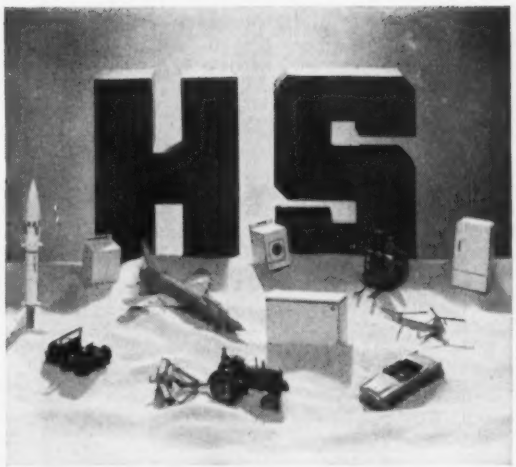
The nylon insert is unaffected by age or cold, has high resistance to heat, and very low moisture-absorption rate. These are but a few of the reasons why Roberton Manufacturing Company uses Republic Nylok Fasteners in its advanced line of power mowers. Advantages like these can pay dividends in *your* application, too. For full information, contact your Republic representative, or mail coupon.



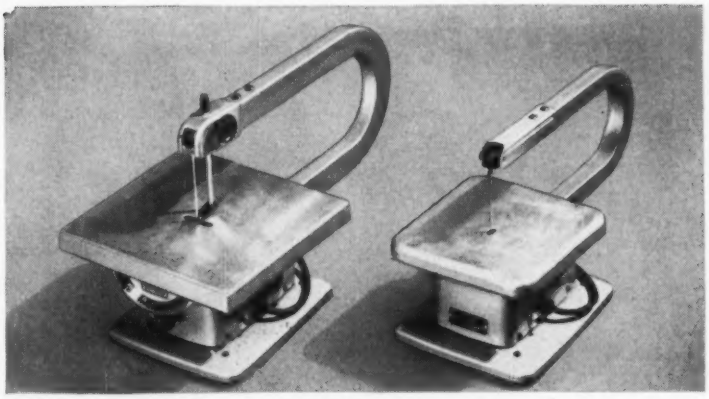
DRIVE UNIT, which furnishes motive power for Roberton Mower is securely held in place by Republic Nylok Fasteners as indicated by arrows. Engine remains tight against base even after years of hard service.



POWER FOR CUTTING is provided by a second, independent engine. Imagine the vibration set up by the swift-moving blade shown. Yet Republic Nylok Fasteners hold engine, wheels, and other parts, firmly in place.



REPUBLIC'S NEW HIGH STRENGTH POWDER, Type HS6460, opens the way to new markets for new applications using sinterings for highly stressed parts. Type HS6460 can be used with existing operating equipment. It provides a minimum tensile strength of 60,000 psi at 6.4 density as sintered, and 100,000 psi heat treated. Type HS6460 maintains its dimensional characteristics after sintering—less than .004 inches per inch shrinkage from die size at 6.4 density. Available in production quantities up to and including 12 tons, or in multiples thereof. Mail coupon for technical data sheet on Type HS6460 Powder.



EASY, EFFECTIVE FABRICATION is a characteristic of Republic Galvannealed Steel Sheets. Severe brake forming, shown above as done by Fogel Refrigerator Company, Philadelphia, does not affect their corrosion-resistant, paint-adhering qualities. Republic Galvannealed Sheets readily take shearing, punching, spot welding, and many other fabricating operations. Mail coupon for more facts.

SAVINGS IN A KEY PART are realized by Syncro Corporation, Oxford, Michigan, by using Republic ELECTRUNITE® Mechanical Tubing in the manufacture of jigsaws. Previously they used a casting for the blade-yoke, which requires a severe bend. ELECTRUNITE Square Tubing was recommended for one model, rectangular tubing for the other. Results: reduction in weight of the blade-yoke, and improvement in appearance of the product, with savings in time, materials, assembly, and shipping costs. For more information mail coupon below.

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☐ Type HS6460 Powder
☐ ELECTRUNITE Mechanical Tubing

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Company_____

Address_____

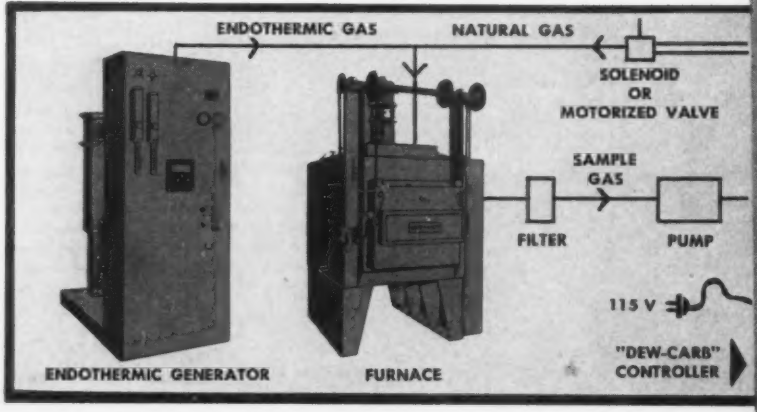
City_____ Zone____ State_____

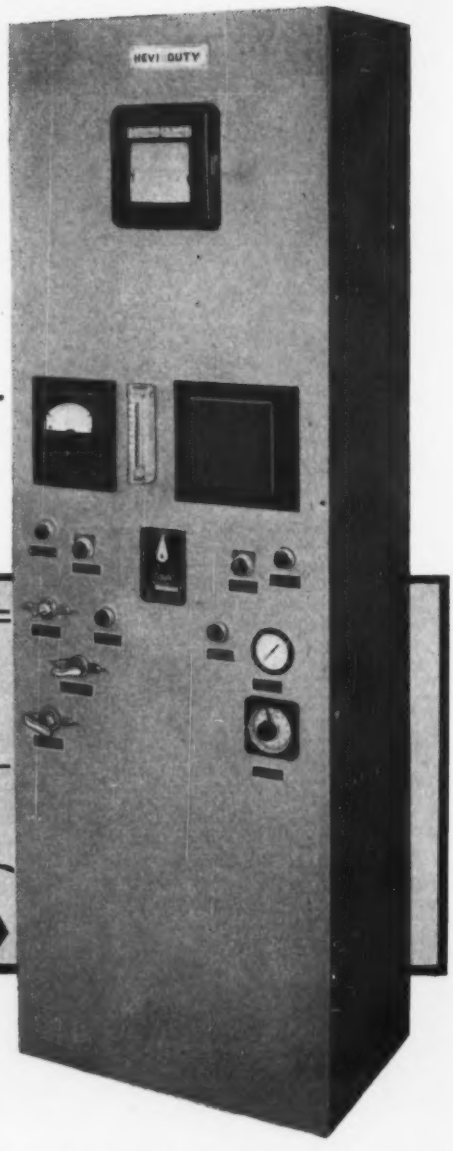
NEW ... *instrument for controlling carbon without cooling*

... from

HEVI-DUTY

"Dew-Carb" Controller measures dew point... controls atmosphere carbon





Provides instantaneous response to sudden change of dew point of furnace atmosphere.

Assures precise measurement of moisture in furnace atmosphere — minus 5° to plus 60° F. dew point.

Does not require cooling of gas sample.

Hevi-Duty's new "Dew-Carb" Controller operates on a wet-dry bulb principle, measuring *precisely* the dew point in controlled atmosphere for furnace processing — bright hardening, carbon restoration, carburizing ... controlling of surface carbon concentration and depth characteristics. No chemicals, such as lithium chloride, are required in this system.

Hevi-Duty's "Dew-Carb" Controller can be utilized in three types of furnace applications:

1. To *monitor* endothermic generator gas, or the gas within the furnace.

2. To *measure* dew point and instantaneously regulate the carbon in endothermic atmosphere. Instrument can be adapted to either generator or furnace ... can be used with one generator supplying endothermic gas to several furnaces ... gas for each furnace can be separately measured.

3. For batch type, enclosed quench furnace applications, such as the Hevi-Duty "Clean-Line" furnace, an automatic system restores atmosphere equilibrium immediately after loading of the furnace, and restarts automatically when load reaches proper temperature.

For more information on the new "Dew-Carb" Controller, write, or call Hevi-Duty today.

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A DIVISION OF BPC BASIC PRODUCTS CORPORATION

HEVI-DUTY ELECTRIC COMPANY, MILWAUKEE 1, WISCONSIN

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Now, one grade of trichlor does both

Whether you clean a rocket or degrease a gear, you can now use Nialk® metal degreasing grade trichlorethylene as your cleaning agent.

This grade of Nialk meets rigid government and industry standards for solvents used to clean rocket and missile components. It leaves little or no residue when it evaporates. At the same time, it keeps the above-average chemical stability needed for vapor degreasing.

The savings in this twofold use of one grade of trichlor can be readily seen. Now you can:

Cut your inventory and make your buying easier.

Avoid errors. No one can pick the wrong drum when you're buying just one grade of trichlor.

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Help end your disposal problems. Usually you can use the Nialk trichlor from your flushing operation in your vapor degreasing operation without distilling, or the solvent can be recovered and used again and again.

STABILITY WITH psp

You get **psp** too, when you ask for Nialk trichlorethylene. **psp** is "permanent staying power," the ability of the stabilizer to keep from wearing out.

You can get more information on this metal degreasing grade of Nialk trichlor. Just write for specifications and data.

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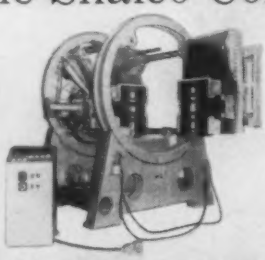
Sales Offices: Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass.

In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

The Shalco Corporation, pioneers in Shell Core Blowers and Shell Molding Machines, joins forces and becomes a Division of the National Acme Company, pioneers in automatic multiple-spindle bar and chucking machines



NAMCO

The National Acme Company

EXECUTIVE OFFICES: 170 EAST 131st STREET, CLEVELAND 8, OHIO • GLENVILLE 1-9080

To The Foundry Industry:

Our "Zone of Responsibility" to the metalworking industry is constantly being broadened to include almost every production step from raw material to the finished product. In joining forces with National Acme, Shalco's exclusive developments and broad experience in the art of shell molding is combined with 75 years' experience in automatic machine tool manufacturing and servicing. The result is shell molding equipment built to the highest standards of machine tool precision and reliability.

Shalco's unique design and manufacturing techniques have resulted in low cost, greatly simplified Shell Core Blowers and Shell Molding Machines with unusual flexibility. We believe this outstanding equipment will now allow the Foundry Industry to take greater advantage of the economy, precision and high quality realized with shell molded castings.

One of the most complete engineering and application services in the industry is available to assist foundrymen everywhere in obtaining optimum results from this outstanding process.

T. L. Stemple

President
The National Acme Company

AUTOMATIC BAR AND CHUCKING MACHINES/THREAD CUTTING HEADS/THREAD ROLLING HEADS AND MACHINES/LIMIT SWITCHES/SOLENOIDS/PUSHBUTTON CONTROL STATION SWITCHES/CONTRACT MANUFACTURING/SHELL CORE BLOWERS AND SHELL MOLDING MACHINES/SAND COATING EQUIPMENT/CORE BOXES/RELATED FOUNDRY SUPPLIES

National Acme

Why SANDVIK has so many different kinds of high carbon and alloyed steel

SANDVIK high carbon and alloyed steels are *specialized* steels. Each type is fitted for a specific service; "custom-tailored" to meet certain exacting physical demands.

Purity of raw materials, special analyses, highly developed techniques in processing and finishing — these are all factors in the production of specialized SANDVIK steels.

If you have an application that calls for unusual physical characteristics and quality in high carbon or alloyed strip steel, 'phone or write SANDVIK.

You can get Sandvik steels

- **In special analyses for specific applications**
- **Annealed, unannealed or hardened and tempered**
- **With bright finish or blue or yellow polished**
- **With round edges or square edges**
- **In a wide range of thicknesses from .001".**

You can get complete information, promptly, on request.

55-24

Write for new Sandvik brochure and stock lists.

SOME SANDVIK SPECIALTY STRIP STEELS
Band Saw Steels • Camera Shutter Steel • Clock and Watch Spring Steels Compressor Valve Steel • Doctor Blade Steel • Feeler Gauge Steel • Flapper Valve Steel • Knife Steels • Matrix Band Steel • Needle Cutter Steel • Piston Ring Segment and Expander Steels • Razor Blade Steel • Reed Steel • Shim Steel Shock Absorber Steel • Sinker Steel Spring Steels • Textile Steels • Vibrator Reed Steel

Sandvik Quality Steels

SANDVIK STEEL, INC.

1702 Nevins Road, Fair Lawn, New Jersey

Tel. SWarthmore 7-6200—In N. Y. C.: ALgonquin 5-2200

Warehouses: Fair Lawn, N. J. • Cleveland • Los Angeles
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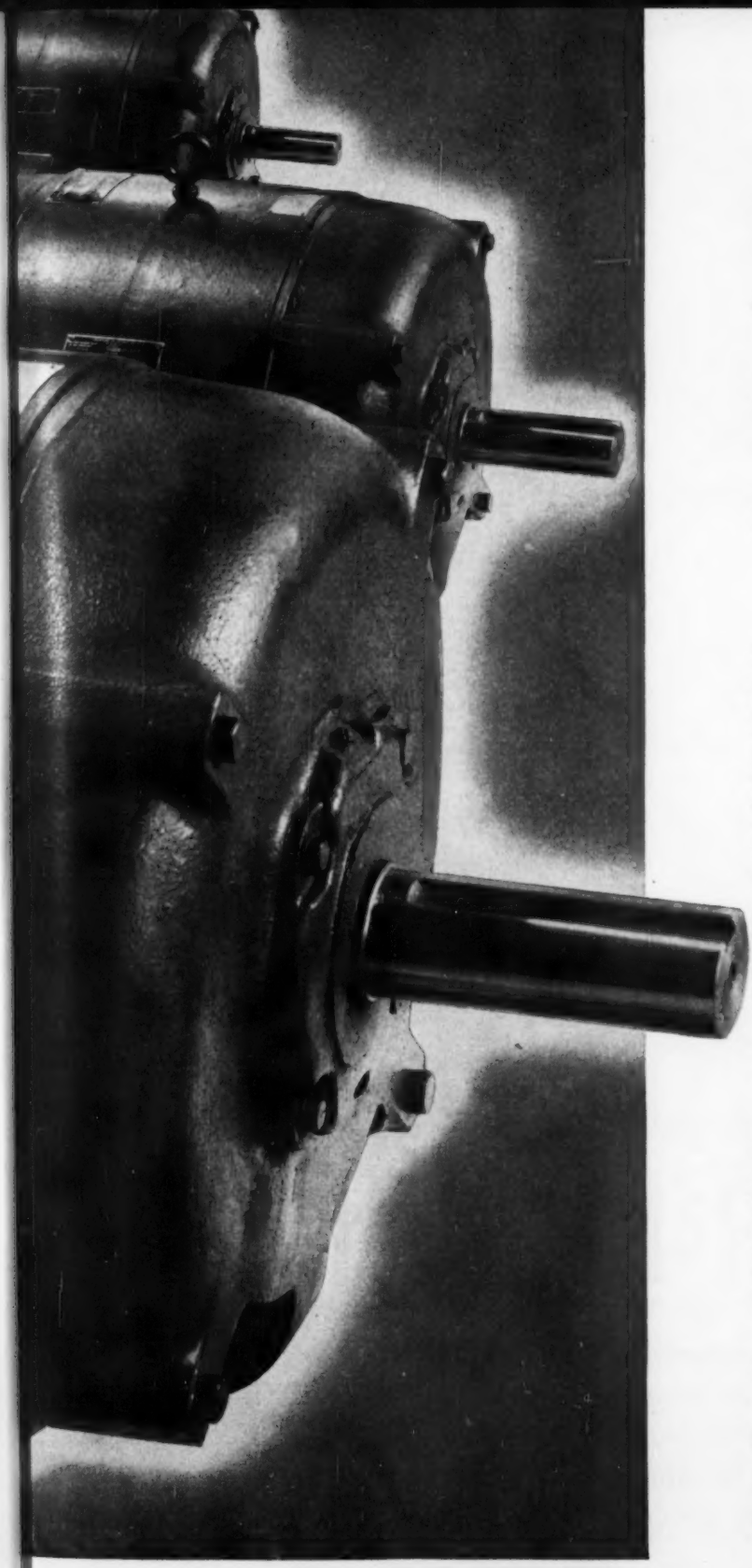
SANDVIK CANADIAN LTD., P.O. Drawer 1335, Sta. O., Montreal 9, P.Q.
Works: Sandviken, Sweden



1959
15,000,000 horsepower

1965
26,000,000 horsepower

In the next six years demand by industry for motors to drive air moving equipment is going to increase about 75% . . . from 15,000,000 horsepower in 1959 to 26,000,000 horsepower in 1965. Other needs are rising even faster. Careful matching of motor to equipment will assure minimum shutdowns for repairs and maintenance. Century Electric application engineers can help you get that right motor by selecting from among the over 10,000 types Century makes.

All types of equipment—Take hard-to-start pumps and compressors . . . with Century Electric motors designed for this kind of application, starting is no problem.

Same thing holds true for fans, pumps, machine tools, ball mills, printing presses . . . Century Electric has the right motor for each.

Reliable operation—Bonded "Mylar" and high-temperature varnish insulation give tough mechanical strength and resistance to moisture . . . rigid cast iron or steel frames mean long life and quiet operation . . . rotors get special balancing tests before shipment to eliminate vibration and assure longer life. . . .

Application aid—To be sure you have the right motor for each application, contact your nearest Century Electric application engineer. He knows motors inside and out because he sells, applies and thinks motors day after day. For details on Century's complete line of motors, write for the Century Motor Application Guide, bulletin 270A. For *more* than a motor . . .

CENTURY ELECTRIC COMPANY

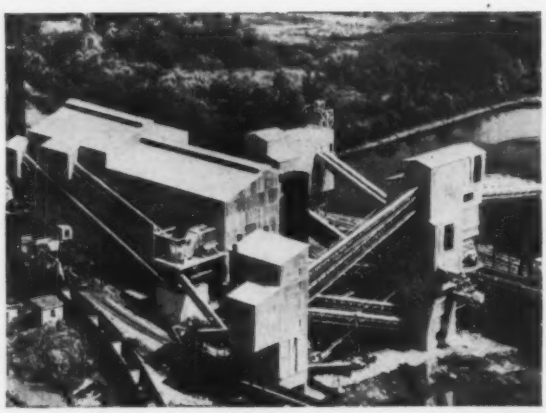
St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Century

59-15

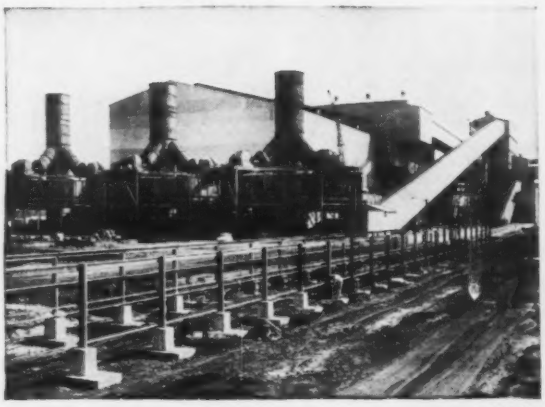
1959

First these:

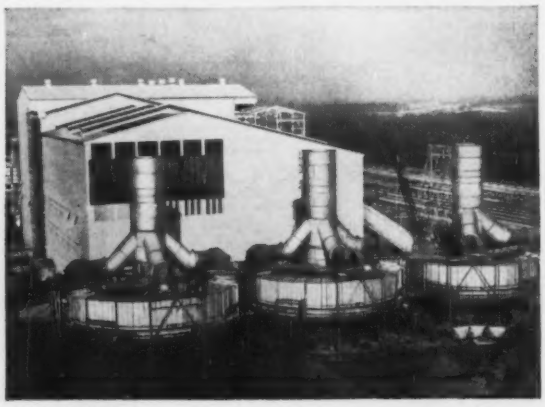


ARMCO

McLOUTH



GARY



SAXONBURG

and now:

THE WORLD'S LARGEST SINTER MACHINE

Sinter machine width: 13′ 2″
Sinter machine length: 184′
Sinter machine area: 2419 sq. ft.
Engineering constructor—Dravo Corporation
For: Jones & Laughlin Steel Corporation, at Aliquippa, Pennsylvania

DRAVO-LURGI

DRAVO
CORPORATION
PITTSBURGH 22, PA.

CIRCLES

BROWN-LIPE-CHAPIN • STAMPING • ELECTROPLATING • POLISHING • PAINTING

WHEEL DISCS by Brown-Lipe-Chapin round out the beauty of today's outstanding automobiles. And your product can also benefit from this lasting sales appeal with the facilities of B-L-C. Whether it is eye-catching appeal, lustrous rugged protection or a light metal border to brighten your sales appeal, we offer you our services backed by years of experience and research. Formed metal parts . . . pressed, rolled, stretch bent or die-cast, can be polished, chrome plated, anodized or painted for you in either of our plants at Elyria, Ohio, or Syracuse, New York. Let our engineers help you right at the design stage to combine beauty and economy in brightening your product. They'll follow your job every step of the way. For prompt attention, call or write Brown-Lipe-Chapin, Syracuse, New York.

GM GENERAL MOTORS

RELIABILITY by BROWN·LIPE·CHAPIN

DIVISION OF GENERAL MOTORS CORPORATION

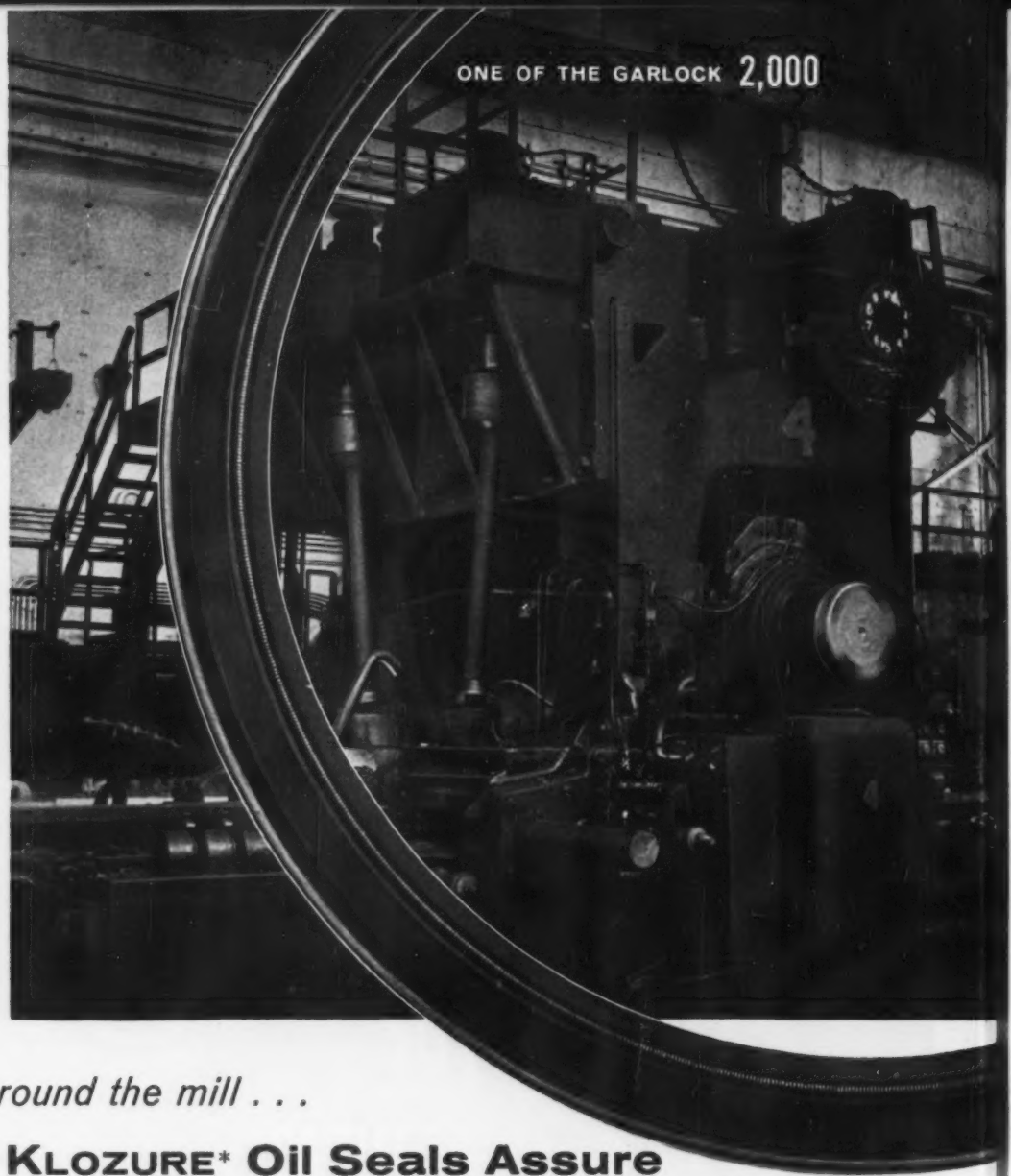
Model 64 assembled KLOZURE for back-up and work rolls. Designed for large shafts, severe service.

Model 82 bonded KLOZURE for back-up and work rolls, normal to high speeds. Comes as large as 44" diameter.

Model 21 or 23 Split-KLOZURE for installation without disassembly of equipment. Medium-speed service.

Model 142 face type KLOZURE for mill rolls. Designed to seal surfaces perpendicular in shaft.

Model 53 assembled KLOZURE for table rolls, normal to high speeds. Withstands temperatures to 250° F.



All around the mill . . .

Garlock KLOZURE* Oil Seals Assure Smooth, Dependable Operation

ON ALL PARTS OF A STEEL MILL, KLOZURE Oil Seals prevent leakage of vital bearing lubrication while protecting the bearings themselves from dirt, slag, scale, and spray. There's a KLOZURE design for *every* job, no matter how difficult.

MODEL 142, for example, keeps water splash and scale out of bearings at the shoulder of a mill roll. Model 53 is recommended for table rolls; Models 64 and 82 are applied for protecting bearings on back-up and work rolls. Where equipment can't be dismantled easily, Model 21 or 23 Split-KLOZURES are the choice.

ALL KLOZURES are oil and grease resistant . . . impervious to water, mild acids, alkalies . . . non-abrasive . . . withstand temperatures from −40°F to +250°F. For extreme conditions, Garlock furnishes sealing elements resistant to practically any fluid, and serviceable as high as +500°F.

KLOZURE Oil Seals are another part of the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals for every need. Call your local Garlock representative, or write for Catalog 30.

*Registered Trademark

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

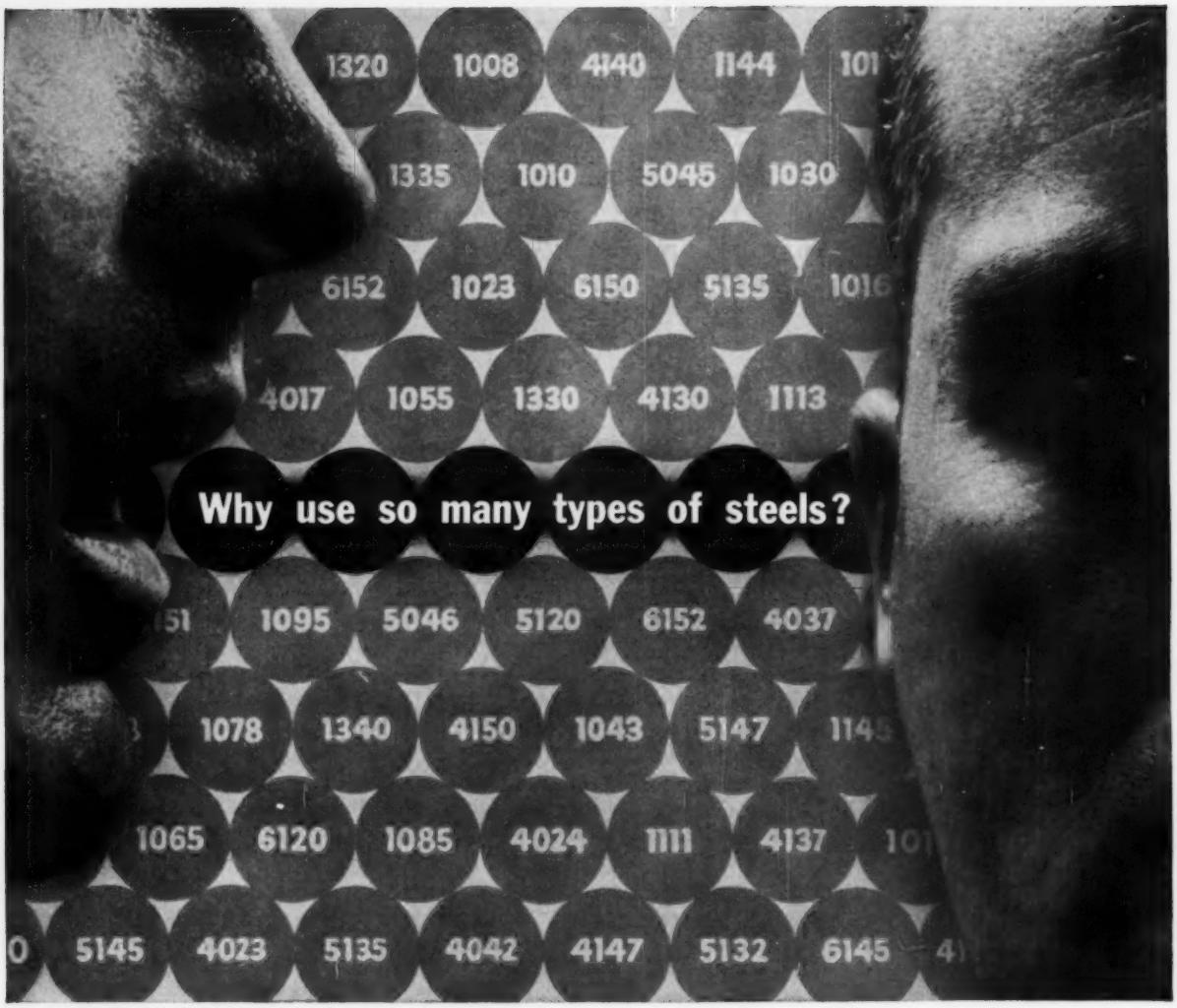
For Prompt Service, contact one of our 26 sales offices and warehouses throughout the U.S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Molded and Extruded Rubber, Plastic Products

Canadian Division: The Garlock Packing Co. of Canada Ltd.

Plastics Division: United States Gasket Company



Just two will do...
4340, 4620 General Purpose Steels

You make your job easier and you standardize, simplify, and save money...

These two General Purpose alloy steels can solve most of your steel selection problems. One a carburizing type . . . the other a through-hardening type — with just these two alloy steels you can satisfy practically all your engineering requirements.

Here's your chance to standardize on materials. To simplify inventory and processing. To save money in purchasing, inventory, production . . .

When you need through-hardening steel, simply specify 4340. It's ideal for parts of any section size. It provides exceptionally high strength and toughness. Responds reliably to heat treatment. It's weldable under proper conditions and machines at relatively high hardness.

And when you want to carburize, simply specify 4620 steel. It resists warpage and distortion in heat treatment. Responds reliably and uniformly, too. Provides a tough, strong core to support the hard wear-resistant case.

Best of all, both are carried by Steel Service Centers from coast to coast, ready for delivery right off the shelf. If you need heavier-duty or special purpose steels for very particular applications, suitable nickel alloy steels are also available from your Steel Service Center. To get a buyer's guide of centers that carry 4340, 4620, and other nickel-containing grades, simply write Inco.

AMERICAN STEEL WAREHOUSE ASS'N.

INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

CF&I-CLAYMONT'S

alloy steel plates on the job in Esso's new Powerforming Unit

The job: Produce five spherical reactors—Catalytic Reforming Units—to convert low octane gasolines to higher octane motor fuels.

The job site: Esso Standard Oil Company's new Powerforming Unit at Baton Rouge, Louisiana.

The job-team: Esso Research and Engineering Company prepared the basic design. Bechtel Corporation, San Francisco, developed the basic requirements and designed the various details. Wyatt Metal & Boiler Works, Inc., produced the shop drawings and fabricated the units in their Houston shops.

CF&I's Claymont, Delaware plant produced the alloy steel plates . . . for the shells and for manheads and nozzle connections.

The specifications: The CF&I-Claymont Alloy Steel Plates were manufactured to ASTM Specifications for Carbon-Molybdenum and Chrome-Molybdenum Steel . . . designed for high pressure and high temperature applications, with increased tensile and creep strength provided in accordance with varying safety factor requirements.

Minimum plate thickness—1⅞ inches.
I.D. of reactors—17 feet 1½ inches.
Net weight of each shell, without internal insulation—95,000 pounds.

The result: Another job well done through co-operative effort.

The CF&I-Claymont plant is equipped and ready to work with *you* by producing plate for any job, to any specification . . . in carbon, alloy or stainless-clad steels . . . in the dimensions, gage and shape of your choice. What's more, Claymont's completely-equipped Fabrications Shop turns out partially or full-fabricated steel plate components (for machinery or structural applications) in accordance with user requirements . . . in small or large-quantity lots.

Get complete information and prompt service through the CF&I sales office nearest you.

CF&I-CLAYMONT PRODUCTS: Carbon Steel Plates • Alloy Steel Plates • Stainless-Clad Plates • CF&I Lectro-Clad Nickel Plated Steel Plates • Clay-Loy High® Strength Low Alloy Steel Plates • Flanged and Dished Heads • Manhole Fittings and Covers • Fabricated Steel Plate Products • Large Diameter API Pipe

Claymont Steel Products

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque · Amarillo · Billings · Boise · Butte · Denver · El Paso · Farmington (N. M.) · Ft. Worth · Houston · Kansas City · Lincoln · Los Angeles · Oakland · Odessa · Oklahoma City · Phoenix · Portland (Ore.) · Pueblo · Salt Lake City · San Francisco · San Leandro · Seattle · Spokane · Tulsa · Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta · Boston · Buffalo · Chicago · Detroit · New Orleans · New York · Philadelphia

CF&I OFFICE IN CANADA: Montreal **CANADIAN REPRESENTATIVES AT:** Calgary · Edmonton · Vancouver · Winnipeg

7087

Lima Type 24 Crane with wagon mounting at work in yard of Allis-Chalmers Pittsburgh Works. Machine handles crating lumber and steel rolled shapes, sheets, plates and bars. It is powered by an Allis-Chalmers engine.

LIMA Type 24 Wagon Crane combines fast, sure lifts with great mobility

The Lima Type 24 with wagon mounting is a versatile, air-controlled, streamlined crane, engineered for ease of handling, snappy performance, and low cost maintenance. Traveling under its own power at automotive speeds, it makes light work of heavy lifting jobs all over the lot. When equipped with a 30-ft. boom, the Type 24 has a lifting capacity of 18 tons at a 10-ft. radius.

Included in the Type 24 design are many quality features that are normally found on machines of larger capacity:

- Air-controlled main and auxiliary operations
- 55 anti-friction bearings
- Power load lowering (optional)
- Large diameter hoist, crowd and swing brakes and clutches
- Independent boom hoist, with engine-controlled boom lowering

The Lima Type 24 is also available with a 6 x 4 truck mounting or with crawlers. For full details, contact your nearby Lima distributor or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON 5916

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

BALDWIN BLH LIMA-HAMILTON

no need for Obsolescence

with BULLARD

VERTICAL TURRET LATHES

Model 75

In May, 1955, Hyster Company, Peoria, Illinois, installed a 36" Cut Master V.T.L., Model 75 and by the end of 1956 it was evident that due to increased requirements an automatically controlled machine was necessary. *Did this obsolete the Cut Master?* — No sir — it only meant adding a Man-Au-Trol Conversion Unit to Cut Master *right in their plant. And it was accomplished in only four days.* No need to obsolete Bullard Cut Master, Model 75 — just convert them.

another way to cut costs when cutting metal — **buy BULLARD**

Man-Au-Trol installed for automatic control of Turret Head.

36" Bullard Cut Master V.T.L. Model 75 manually controlled from Pendant Control.

Bullard Service Engineer guides Man-Au-Trol Conversion Unit into place.

Electrical connections for Man-Au-Trol are wired into Cut Master Control Panel.

For the complete information on Bullard Vertical Lathes call our nearest Sales Office or Distributor.

THE BULLARD COMPANY

BRIDGEPORT 9, CONNECTICUT

Your new plant or expansion idea

Raw materials available?

Right process chosen?

Location correct?

Capacity adequate?

Economically sound?

Readily financed?

Kaiser Engineers designs and builds major facilities for the Steel industry, and is U. S. licensor for the proven L-D Process of oxygen steel making.

Among KE's most valued services are sound, searching economic analyses, feasibility studies and site evaluations. In a word—*Pre-Engineering*—impartial, outside analysis which helps you decide whether to proceed with, defer, or modify the project.

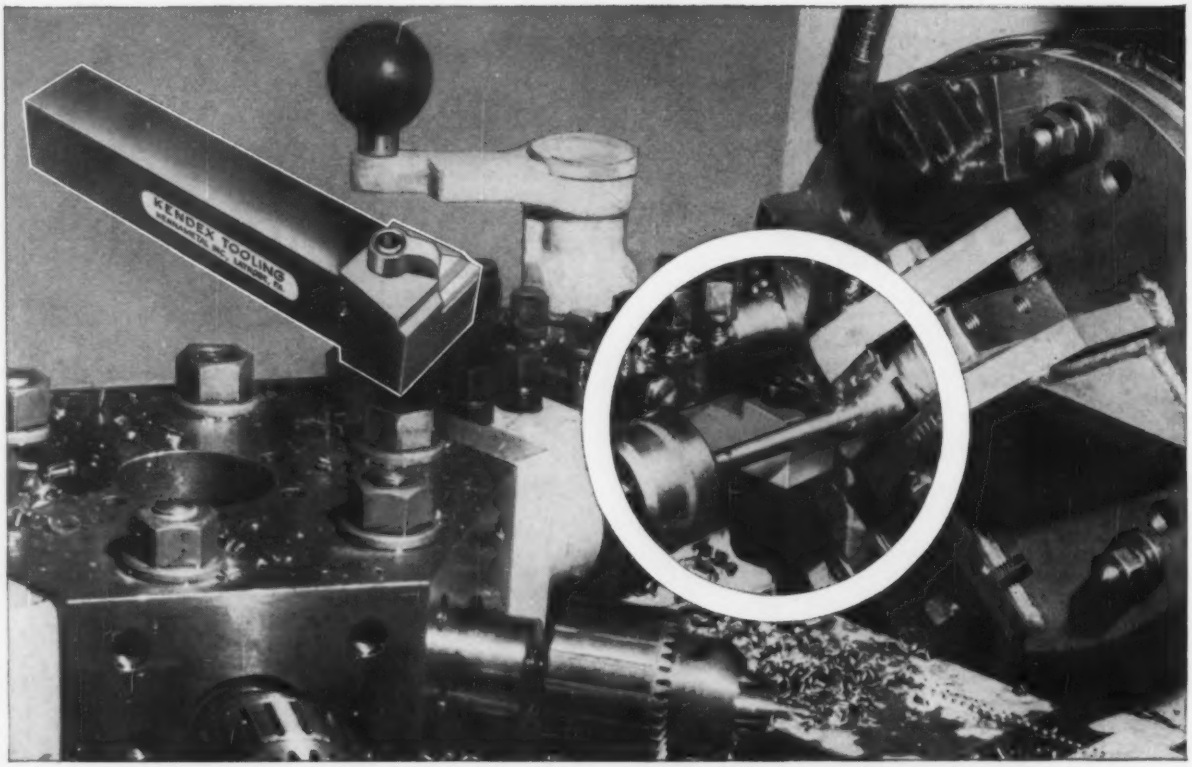
Kaiser Engineers offers you cost-saving, time-saving, one-company service from concept through start-up.

KAISER ENGINEERS

Division of Henry J. Kaiser Company
Oakland 12, California
Pittsburgh, Washington, D. C., Chicago, New York

• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

5488-9



Support bracket for Nike-Hercules guided missile, being machined with Kendex* (patented) tooling from a 316 stainless forging. Photo and performance data supplied by a leading aircraft manufacturer.

If you could cut machining cost/piece 78% wouldn't you switch to KENDEX?

That's what happened here

Two turret lathes with high speed steel tools operating on a 10-hour shift could not meet the demands of an assembly line in an aircraft plant. The job involved turning a ½-inch stud and an interrupted facing cut on a forged stainless steel part.

When one lathe was equipped with Kendex (patented) tooling and Kennametal* K8 inserts to utilize maximum output capability of the machine, production was increased fivefold and enough parts were produced by this one machine in 8 hours to keep the line running. The second lathe was released for other work.

While tooling cost per hour increased over 500%, the machining cost per piece dropped from $3.08 to 68 cents. By sacrificing a few pennies in higher tool costs, many dollars are being saved in over-all machining costs.

Progressive plants everywhere are using Kendex throw-away insert tooling on production operations and many short-run jobs to obtain highest possible machine efficiency. They have found that "babying" tools to get long tool life is a costly practice.

Ask your Kennametal Carbide Engineer how Kendex can help you get more efficient output from *your* machines . . . or write direct for the booklet, "There's Profit in Retiring a Tradition." KENNAMETAL INC., Latrobe, Pennsylvania.

*Trademark

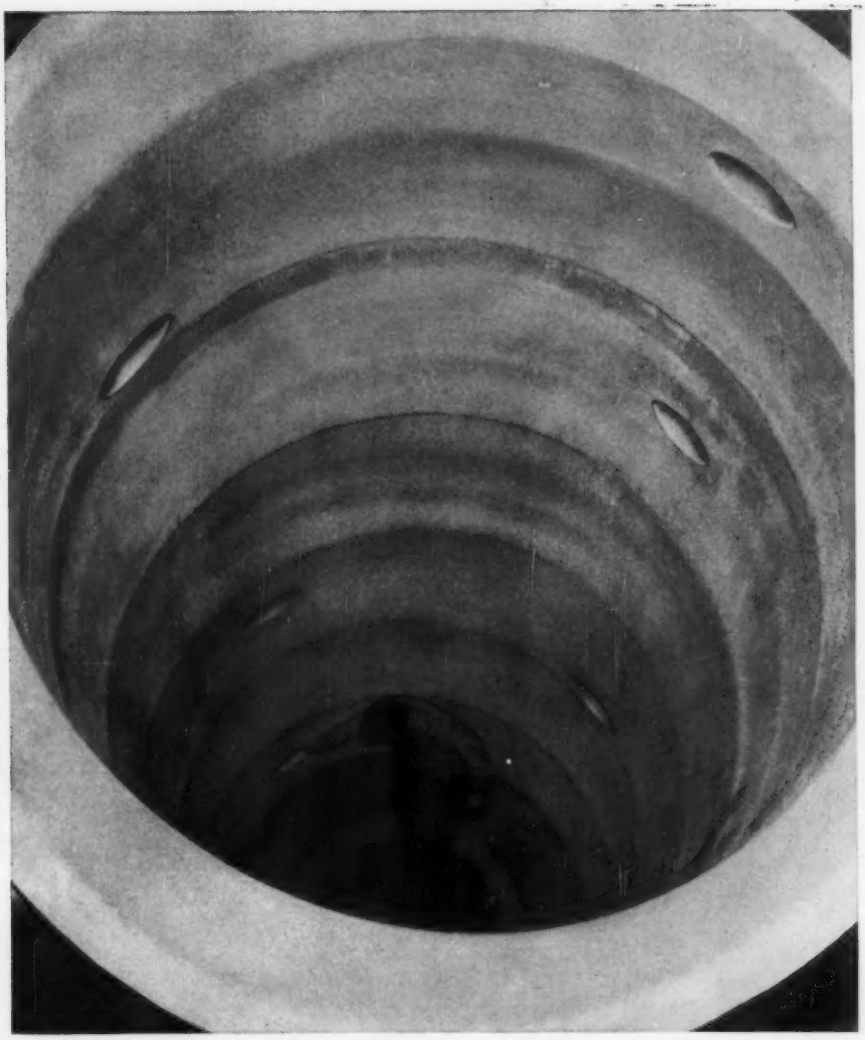
97288

Don't waste dollars in machine output to save pennies in tool life

	640-minute tool life	125-minute tool life
Machine cost per hour	$ 6.00	$ 6.00
Tool cost per hour	.16	.86
Combined cost—8 hours	$49.28	$54.88
Pieces produced—8 hours	16	80
COST PER PIECE	$ 3.08	$ .68

INDUSTRY AND **KENNAMETAL**
...Partners in Progress

How to reduce furnace heat loss



Vertical pit-type carburizing furnace (9' x 24') lined with a refractory insulating castable made with LUMNITE cement. Furnace temperature 1800°F. Badali Engineering & Manufacturing Co., Hammond, Ind. Castable used: "Kast-O-Lite," product of A. P. Green Fire Brick Co., Mexico, Mo.

Refractory insulating concrete, made with LUMNITE calcium-aluminate cement, is being specified for linings in many types of industrial furnaces. It helps trim fuel costs by reducing heat loss and increasing heat storage. This helps shorten heating-cooling cycles and provides closer temperature control. In addition, the smooth, jointless concrete surface reduces air infiltration.

Construction with refractory concrete is fast, easy, economical. Linings can be cast in place, troweled or "gunited." Service strength is reached in 24 hours.

For convenience, manufacturers of refractories offer castables bonded with LUMNITE cement – packaged mixtures ready for use with just the addition of water. For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

"USS," "Atlas" and "Lumnite" are registered trademarks L-193

Universal Atlas Cement
Division of
United States Steel

OFFICES: Albany • Birmingham • Boston • Chicago • Dayton • Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • St. Louis • Waco

NOT ALL LEADED STEEL IS MADE BY INLAND...

BUT...

we've made more of it than anyone else . . . in fact, the first experimental heat and the first production heat of leaded steels were made in Inland furnaces.

Since then, more than 20 years ago, we've never stopped probing, refining, perfecting the process. And today we offer INLAND LEDLOY*—the leaded steels of highest quality, uniformity and dependability—the standard against which all other free machining steels are compared!

If you have any question about leaded steels . . . if increased machinability, higher speeds and feeds, easier tolerance control, greater production per tool change and fewer finishing operations sound good to you . . . we suggest you come to Inland . . . makers of LEDLOY, the original leaded steel.

INLAND LEDLOY steels are available in a wide range of standard carbon and alloy grades in bars or plates from your Cold Drawer or Steel Service Center. See them for LEDLOY and write to Inland for the booklet, "Properties of Inland Ledloy Steels".

*Reg. Trade Mark

LEDLOY *the world's most machinable steels!* INLAND STEEL *30 West Monroe Street · Chicago 3, Illinois*

INLAND *Sales Offices:* Chicago · Davenport · Detroit · Houston · Indianapolis
Kansas City · Milwaukee · New York · St. Louis · St. Paul

CURRENT SPENDING FOR CAPITAL EQUIPMENT may not be up to expectations, largely because of the steel strike. But there are some straws in the wind of big things to come. One is a surge of spending by automotive and appliance makers for large, highly-automated press lines. Usually, one major movement in capital spending is followed by a general pattern.

CHEMICAL PROCESSORS ARE STILL BIG BUYERS of metals and metal equipment. But any product now has to have special qualities to rate consideration. Demands from processors for better alloys and equipment, plus the challenge from competing materials, have increased quality and performance standards.

MANUFACTURERS OF COLOR TV sets are looking for the long-awaited upward sales trend to arrive in 1960. Makers are working to develop simpler, less expensive picture tubes. Substantial price cuts (say, from $100 to $200 less than current prices) are still not in view. But they may be coming. If sales prospects brighten, more companies are expected to get into the field.

IN CRACKING A MAJOR MARKET, like automotive, the important aspect is not necessarily total use, but where the inroad is made. This point is made by Reynolds Metals Co. in pointing to major breakthroughs this year in the auto industry. Main points: aluminum engine in the Corvair, trim panels for busses. These are expected to point the way to much bigger tonnage markets in the near future.

PRODUCTION ENGINEERING AND TOOLING for devices to cut air pollution by autos is under way. The market will be in California, where auto fumes are blamed for much of the smog problem. Uncomplicated and inexpensive, the units feed crankcase fumes back into the engine by a system of piping and valves. They may be ready for 1961 models.

DETROIT IS LOOKING FORWARD TO THE BUSIEST quarter in history next January, February and March. Whether the goal is reached depends, of course, on whether the steel strike resumes next Jan. 26. The goal for the quarter is 2,250,000 cars. Best quarter to date is 2,129,000 in the first quarter of 1955.

BUT FOR THE SHORT TERM, STEEL SHORTAGES continue to hurt. The National Assn. of Purchasing Agents November survey indicates that 85 pct of all plants will curtail operations in December because of lack of steel.

here's the really new

Cleveland Worm and Gear

SPEED REDUCER

It was Designed to Provide: High Horsepower in a Smaller Unit • Centrifugally Cast Bronze Gears • Alloy Steel Worms Heat Treated By An Exclusive Process for Carrying Higher Loads • Fan Cooling for More Efficient Operation • Maximum Overhung Load-Carrying Capacity • Ribbed Housing for Maximum Strength and Heat Dissipation • Modern, Streamlined Design to Enhance Your Machine's Appearance.

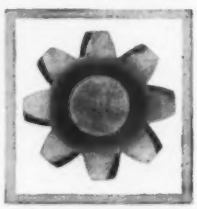
Cleveland's new speed reducer line meets AGMA Standard 440.03 — which permits higher horsepower and torque ratings — provides you speed reduction at savings of 50% or more on cost per horsepower. All this, with no deviation from Cleveland's standards of quality and dependability.

Remember, this strikingly new line of fan-cooled reducers — now available from one to forty horsepower — incorporates all the design knowledge gained by Cleveland's engineers over the past 47 years — plus all the advantages of modern metallurgical techniques and advanced manufacturing processes. Consult your Cleveland Representative for the complete story on this new speed reducer — or write us direct for Bulletin No. 405. It details input horsepower and output torque ratings, service factors, application and load classifications, as well as general over-all dimensions. **The Cleveland Worm & Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.**

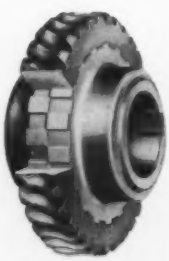
A subsidiary of
Eaton Manufacturing Company
Affiliate: The Farval Corporation

CLEVELAND
Worm Gear
Speed Reducers

Check these new exclusive Cleveland features



Cleveland's Worm's, heat-treated by an exclusive process, possess a high degree of hardness throughout their entire thread thickness — and well below the worm's root diameter. This gives maximum thread strength and resistance to wear without losing the advantage of a tough core of medium hardness.



Centrifugal cast bronze rims have a greater density and a higher hardness, giving increased resistance to wear and fatigue pitting. They are centrifugally cast integral with cast iron centers on 6" and smaller sizes. This permits strong mechanical keying of the two parts — without dependence on actual surface bond. Gear shaft extension diameters are especially large to permit greatly increased overhung load capacity.

Worm and gear shaft bearings are Timken taper roller type, providing adequate thrust and radial capacity. Worm bearings are mounted directly in the housing bore for greater rigidity.

SPECIAL REPORT

Experts Build Case for Higher Depreciation Rates

Faster plant and equipment writeoffs will stem inflation and industrial obsolescence.

So argued tax experts at hearings of the House Ways and Means Committee last week.

Some revision of depreciation laws is expected next year.— By E. C. Beaudet.

GOOD LISTENER: James Polk, New York tax expert (l.), chats with House Ways and Means Committee Chairman Wilbur D. Mills before hearings.

▪ If attendance means anything, the move to revise depreciation laws got off to a good start in Congressional hearings last week.

Nearly all members of the House Ways and Means Committee were on hand when Chairman Wilbur D. Mills called the hearings on depreciation to order.

Good Reception — At a time when Congress is not in session, and many congressmen are campaigning in their home districts, the turnout was surprising.

Equally surprising was the sympathetic reception given to the testimony of the panel of tax experts. As one panel member put it later, "The committee was more unanimous than the panel."

This was not unexpected. The panel apparently was chosen to represent a wide range of views on just how the depreciation laws should be changed—if at all.

Common Ground — But while their methods may differ, all but one of the tax experts called for more liberal depreciation allowances to further the country's economic growth and protect the national security.

To compete with low-priced foreign goods in all markets and to halt inflation, American industry must be allowed to write off the cost of plant and equipment at a faster rate, they argued.

Joel Barlow, Washington attorney, favoring the adoption of a bracket system for determining the useful lives of equipment by classes, put it this way.

"Our outmoded tax depreciation structure has left us with a higher obsolescence factor in industrial plants than that of West Germany or England, our principal competitors."

Growth Climate — "A modified Canadian system or bracket method would create the climate for the more rapid economic growth which we need to keep pace with our international competitors, including Russia."

He feels this method would not only be a strong incentive to replace outdated machinery, but would also result in more equal treatment for all business.

"Today in this country," he said, "we have competitors carrying on almost identical operations with one of them required by the (Internal) Revenue Service to depreciate productive equipment at 3 pct while the other is allowed a depre-

NEXT WEEK

Industry Reports — What Industry leaders want in the way of depreciation revision will appear next week.

Comments are from The Iron Age survey of depreciation practices (Dec. 3, p. 81).

VIEWPOINTS: Joel Barlow, Washington attorney (l.), talks over tax problems with accountant Maurice Peloubet (center) and Prof. Joel Dean.

WANTS LIFO: Prof. William A. Paton urged use of Lifo principle.

ciation rate of 8 or 10 pct."

Inflation's Impact—Taking a different tack, Prof. William A. Paton, of the University of Chicago, urged more recognition be given the effect of inflation on the original costs of plant equipment for depreciation purposes.

He said: "If we want to express the amount of cost incurred, we have not told the whole story by simply reporting, for example, $100; To provide meaningful data we must speak of 1940 dollars, 1950 dollars or 1959 dollars."

To overcome the declining value of the dollar and its impact on depreciation set asides, Prof. Paton felt "all that is necessary to remedy the unfair and unsound treatment under which the owner of plant assets has been suffering, is to permit the application of the LIFO treatment in the determination of the deduction for depreciation—the cost of plant capacity consumed."

Middle View—Maurice E. Peloubet, N. Y. public accountant suggested an approach to the problem which combined part of both these views.

He asked for the adoption of methods which result in accelerated depreciation, shorter lives, higher rates, or some sort of flat allowance at the time the new depreciable property is purchased, or which give recognition of the declining value of the dollar.

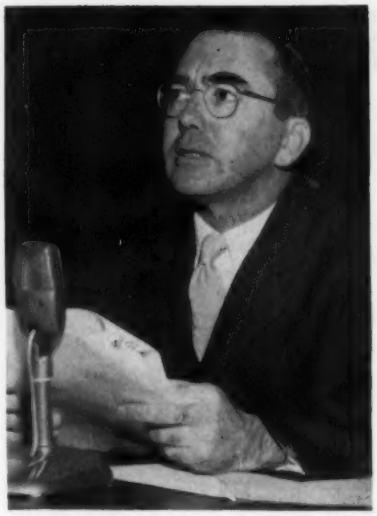
"When we are considering any method which attempts to recognize inflation, we should bear in mind that it is replacement of investment with which we are concerned," he said.

"This is the only type of replacement which can be satisfactorily measured and it is the type of replacement to which the taxpayer is entitled. The purpose is to express in current dollars the real value of the property worn out or consumed."

Action Needed — Since most panel experts were agreed that some form of liberalized depreciation is a necessity, Mr. Peloubet stressed that the important thing needed now is legislation.

Joining him in this view was George Terborg of the Machinery and Allied Products Institute. The seriousness of the problem, he said, calls for the government to

LEAD OFF: Prof. Sidney Davidson and Prof. Robert Eisner lead off the tax hearings. Prof. Eisner opposed depreciation revision.



SPEAKS UP: GE tax expert George Kitendaugh makes case at hearings.

sit down and seriously study the mechanics by which depreciation reform might take shape.

The lone dissenter among the panel of tax experts was Prof. Robert Eisner of Northwestern University.

He opposed any further liberalization of depreciation allowances on the grounds that it would lower federal revenues and primarily benefit stockholders and other owners of businesses.

"Depreciation deductions," he said, "also tend as well to subsidize the inefficient, profitless firm by permitting it to go along without paying for its share of the government services we all enjoy."

The plight of the inefficient companies was brought up from another angle by The Rev. William T. Hogan, S.J.

Small Firms Suffer—Speaking of smaller companies, he said: "During the past few years, they have been under considerable pressure from mounting costs and their only hope is to reduce these costs by modernizing plant and equipment. This requires capital and at the present time it cannot be obtained from depreciation and profits."

One solution he suggested might be the absorbtion of smaller companies by larger ones. But, he pointed out, our anti-trust policies work against this. However, changes in depreciation policies which would permit smaller companies to replace worn-out machinery with more productive equipment would help considerably."

Foreign Threat—The problem of foreign competition was another danger area outlined by Father Hogan. He pointed out that "many American firms have set up manufacturing divisions abroad in order to take advantage of the lower labor costs."

"In the past we have maintained high wages and were able to compete because our equipment was superior. This is no longer the case."

How Things Stand — Just how did the committee view these various arguments for depreciation reform? Of course, no one could expect any member of the committee to openly endorse a particular proposal at this time.

However, in questioning the panel, it was evident that the members were much concerned with the problem of inflation, obsolescence, and foreign competition.

Rep. Noah Mason said, "We must keep after a solution for this problem and not lose ourselves in the different theories brought before us."

Best Chance—The best guess of panel members and industry people attending the depreciation hearings was that reform might come about through emphasis on the growing rate of obsolescence rather than an adjustment for inflation.

The reason: While the two are intertwined, there would be less objection from the public beset by inflation problems concerning insurance, veterans pensions, and social security.

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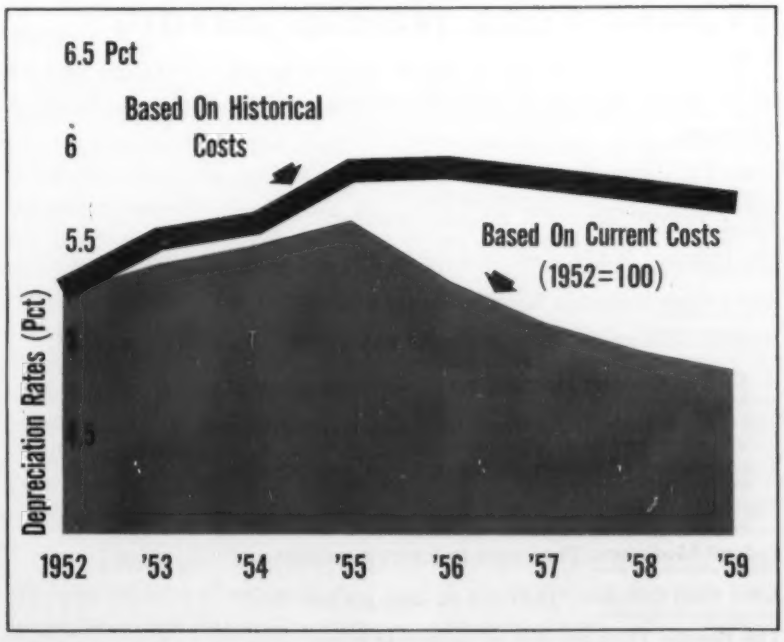
Inflation's Impact on Rates



CUT DOWN: Chart shows how inflation, in effect, lowers rates manufacturers use to write off the cost of plants and equipment. Prepared by Maurice Peloubet from SEC, FTC and Commerce Dept. data.

Steel Stalemate Still Unbroken

Prospect of a "Mandated" Contract Strengthens

The issues may be too strong for either side to yield voluntarily on major points.

Final government action is likely unless the unexpected happens.—By Tom Campbell.

▪ Chances for a voluntary settlement of the steel hassle are dim: About as dim as a burnt out Christmas bulb. It's that bad.

Steel company and labor negotiators—and mediators—might as well have gone Christmas shopping last week for all the progress that was made.

USW's New Offer—Union president David J. McDonald's attempt to ride Mr. Eisenhower's coattails after Ike's nationwide scolding of both sides raised hackles on the steel side. Two "new" suggestions by Mr. McDonald were old hat.

His suggestion that the Taft-Hartley Board should make settlement recommendations was a variation of previous union attempts to get a fact-finding board into the act. The demand that U. S. Steel board chairman Roger M. Blough—and other top steel leaders—meet with Mr. McDonald was also a rendition of past songs.

Cooper Stands Fast—R. Conrad Cooper, the chief steel negotiator, will not be by-passed in the negotiations by steel company heads. Steel leaders have said repeatedly that Mr. Cooper will make any agreements which result from negotiations.

Mr. Cooper also played his older tunes. They were that the steel firms' offer was fair and equitable and should be accepted forthwith by the union.

Sidebar arguments over the explosive 2-B local practices clause broke out in secret meetings at Washington last week. The union claims the latest company offer on 2-B is worse than the previous one.

Displacement Argument — The reference is to the retraining clause in the company's "last" offer. This applies to 2-B only. It does not cover—legally at least—men displaced by new equipment, new techniques and new automation.

The steel industry has no limitations on it where new equipment and new techniques are concerned. The bitterly fought 2-B clause applies to older equipment, techniques and long established local practices.

The union insists that the retraining clause, applying only to 2-B, leaves the companies free to ditch workers where new equipment is concerned without retraining. This may be high-level fly specking. Some sources say this vocal doodling between both sides is pseudo industrial relations haggling.

The general management idea is that a successful 2-B clause would not mean wholesale firings, replacements and downgrading. It is a good guess that retraining eventually would apply to all steel workers who were displaced—if the union agreed to the companies' version of 2-B. But for now, Mr. Cooper has said a resounding "no" to any change from exactly as he has presented his arbitratible "sentence" on 2-B.

It's Loaded—It is in this area where all the dynamite is hidden—

Whose Face Needs Saving?

There is a lot of face saving due in the steel hassle. The Orient isn't the only place this seems to be needed. Just how it will be done in steel remains a mystery.

Here is the lineup:

The President: He wants no price increase.

The Industry: It will agree to a small raise and work rule changes only.

The Union: It wants a Kaiser-style agreement.

David J. McDonald: He wants some way out of the dead-end street.

R. Conrad Cooper: He must have 2-B revision—or else.

The Vice President: He wants to announce a settlement.

The Secretary of Labor: He wants to be vice president.

The Customers: They want no price increase or big pattern.

Federal Mediators: They want to forget it quickly.

Some Steel Officials: "How did we ever get into this?"

The People: They are sick of the whole thing.

Congress: It will take everyone off the hook—maybe.

what hasn't already been exploded. This is the real bottleneck to an agreement, no matter what each side says to the other.

Forced Settlement Likely—The biggest time-bomb set off by the companies among the workers was the retraining clause. This, the workers believe, bore out the union's contention that a change in 2-B was for the purpose of wiping out 50,000 or more jobs. Whether this is true or not is beside the point. It is what middle-aged, and some younger workers feel is true.

With this emotional stance of the workers, and with both union and management stuck with their positions, a voluntary settlement appears hopeless. In the past the union has won when a panel came into the picture. The same would be true this time. (See Washington, P. 81.)

The companies have also lost when politics came into the bargaining. The same would be true in this case: Except that if the steel side could claim a "mandated" agreement, U. S. Steel would be free to raise prices if the settlement was considered inflationary.

Price Situation—But that is too simple. U. S. Steel doesn't want to raise prices. Nor does it want any package above what has been offered. As long as U. S. Steel does not raise its price, others will not try because they wouldn't get the business.

Panel Likely—The prospect is still for a Presidential panel with power to strongly recommend a settlement. Extension of the injunction has been talked up for several weeks. It may go to the ash can. No politico running for office wants to commit political suicide.

Vice President Nixon has been in the wings since last June. Then —as reported in IRON AGE—he almost made the grade. If he can rustle up a settlement before Ike gets back, it will be more ammunition for his Presidential campaign. But steel companies' resistance to "outside" pressure may nip a Nixon settlement in the bud.

Degassing Aims At Tonnage Steels

Just about all U. S. steel-makers are considering a new German vacuum degasser.

Here's why they are interested, and what to expect.—By G. J. McManus.

▪ Vacuum treatment of steel is moving towards what looks like a breakthrough into tonnage applications.

Two weeks ago Crucible Steel Co. announced it was installing a vacuum degassing unit at Midland, Pa., developed in Germany by Dortmund Horder Huttenunion and marketed in this country by McGraw Edison's Lectromelt Division.

Last week plans for another DHH unit were revealed by National Forge Co., Irvine, Pa. And a third installation is called for in engineering plans of one of the largest carbon steel producers in the country.

A Trend—These are not isolated moves. Virtually every major mill is looking closely at the DHH process. Some have reservations, but all are interested. And the interest is not confined to treatment of high cost specialties. Vacuum degassing is being considered for openhearth and basic oxygen steels as well as for electric furnace grades.

"I see no reason why at least 10 pct of the steel in this country should not be degassed, and degassed profitably," says a top researcher for one mill.

The Advantages — Behind this stir is the promise of improved steel quality at a cost that makes sense. By pulling gasses out of steel, Crucible expects "improved hardenability response, improved drawing characteristics, greatly improved machinability and improved mechanical properties."

Cost is estimated by Lectromelt at $2.50 to $5 a ton, depending on volume. Quality gain tends to offset this by giving a higher percentage of usable steel. In German applications, Lectromelt says all the added cost of degassing was often offset by increased yield.

No Competition — This puts DHH degassing competitive with vacuum melting systems being used in this country. Prices of hot work die steels rise sharply when you go from air melting to consumable electrode vacuum melting. In bar form one hot work die steel for missile use costs 50¢ a pound air melted and $1.30 a pound when vacuum melted.

The wide commercial potential of vacuum degassing is spelled out by capacity ratings. Crucible's new degassing unit will be able to handle heats to 200 tons, with an annual capacity close to one million tons. The one installation will take more than four times the amount of metal than can be processed in all other vacuum furnaces in the country.

No Trouble—A key to the tonnage capability of DHH degassing is that the process supplements existing facilities without replacing or disturbing them.

Other advantages: The purified state means greater economy and closer control in additives. Normally about three lb of aluminum would be added per ton to get .030 pct metallic aluminum in the steel. Specification can be met with about one lb per ton on degassed steel.

Another avenue being explored is the use of vacuum degassing to handle the final reduction of low carbon heats.

ASM's Electronic Library Speeds Tech Literature Research

Machine in Documentation Center of Western Reserve Univ. will search 100,000 tech papers per hour.

The low-cost service will make metallurgical data on a given topic available in seconds instead of days. — By T. M. Rohan.

▪ The tedious job of "searching the literature," encountered by all research engineers, will get a big lift soon from electronics.

The 30,000 member American Society for Metals has teamed with the Documentation Center of Western Reserve University in Cleveland to install an electronic machine which will search 100,000 technical papers per hour for data on metallurgical research and related problems.

References will be stored on magnetic tape. The papers number 23,000 abstracts from the ASM files, 28,000 more on the way from the National Science Foundation and a running flow of new technical literature from all over the world.

Instant Information — For research men in industry, this means that almost instantly they can have at their fingertips a gathering of all available data on a project. Firms will also be able to have their own centers of information, supplement the data with internal confidential company or defense classified information—all stored on magnetic tape or punched cards.

"We are now going into high gear on projects," says Mrs. Marjorie Hyslop, editor of the ASM Review of Metal Literature, who is coordinating the project. "We appropriated $75,000 for the Western Reserve project in 1955 to see if the system will work. We are sure now that it will, so are going ahead offering its facilities to industry. Several customers have already subscribed.

"This is not a money-making proposition in any way, but it will be a major backstop to all metalworking and producing industry and related fields. It is far more complete than any one firm would feel justified in setting up, but is designed to fit in with existing technical libraries."

Three Plans Offered—The service is being offered in several ways. For a single "Bibliographic Search" on a given subject, it is done on a bid basis. Broad requests will naturally cost more than very specific ones.

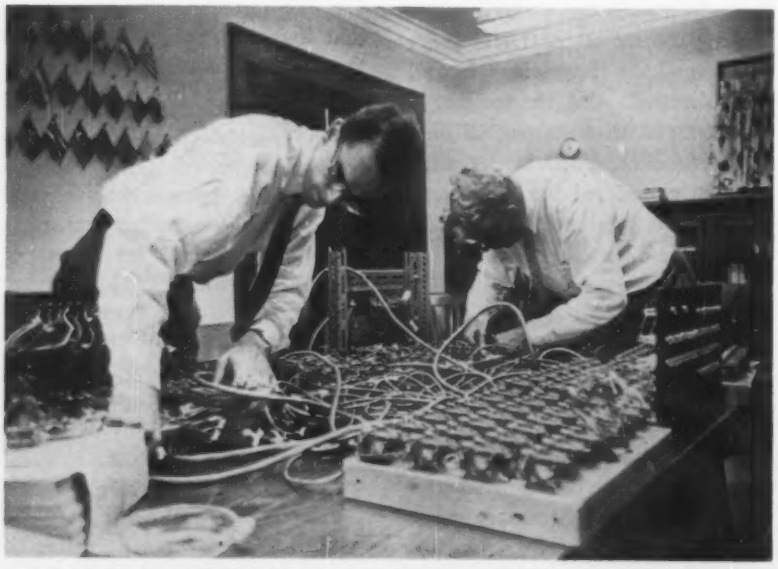
For example, a recent request for all available literature on semi-conductor metallurgy for the last 10 years was estimated at $900 and would take three months. A more specific request for a vaguely remembered article in 1920 comparing the Charpy and Izod notched beam impact tests and all subsequent literature on the subject was quoted at only $90.

With the new machine, service will be much faster, and eventually cost only a fraction of the present.

Subscription Rates—"Current Awareness" is another method; literature on a given subject will be sent every two weeks. There will be a lag of only two weeks for current published literature in the U. S., and about one month for foreign. This will cost $300 per year base price per question. It will also include secondary references.

The third type is "Generic Searches," which will cover current subjects like explosive forming and zone melting. Here abstracts will be sent out every two weeks on all new literature on the subjects. This will be on an annual subscription basis of $200. The same mailing can, of course, be sent to a wide variety of interested parties.

Dry Run Experience—In all cases



SEARCH PROGRAMMING: Dr. J. W. Perry (right) and William Sawyer, an assistant, are shown assembling a component of the searching machine.

of electronic research as well as conventional, the narrower the subject can be confined the more pertinent the references will be and at less time and effort expended.

In a dry run at the Western Reserve center, for instance, a question was entered on "notch sensitivity of high strength steel." The machine snowed the questioner with 234 abstracts. Of these, he judged only nine to be pertinent and 31 of peripheral interest. The ambiguity of "high strength" steels as well as various types of notches was admittedly the culprit, according to the questioner.

In other runs on "ductility of beryllium," pertinency was much better. On the more specific "vacuum melting of nickel-containing materials," the machine scored 100 pct pertinent.

Some Limitations—Another dry run of 1000 commercial metallurgy articles from the New York Times came up with 142 references of which 121 were pertinent. And each of the 21 false selections could have been avoided with more specific question phrasing.

There are other limitations, of course. A question like "I want a list of materials for solving the reentry problem on missiles" will draw a blank. A better approach would be to give anticipated conditions and properties. For instance, how much strength is necessary, weight limits and temperature, and then ask what materials have been tested for the application.

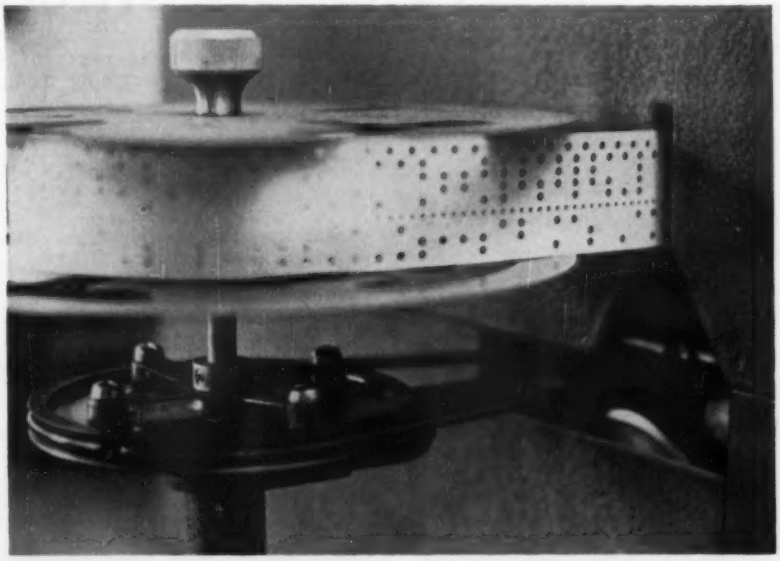
No attempt is made to evaluate literature either, so the service can't substitute for a consultant.

Speed Limits — The electronic searching is based on a system evolved at Western Reserve by Dr. J. W. Perry, director of the Documentation Center there, and Allen Kent, associate director. The homemade punched tape and relay machine they built with the help of students has been in successful use for several years and has established that it will work.

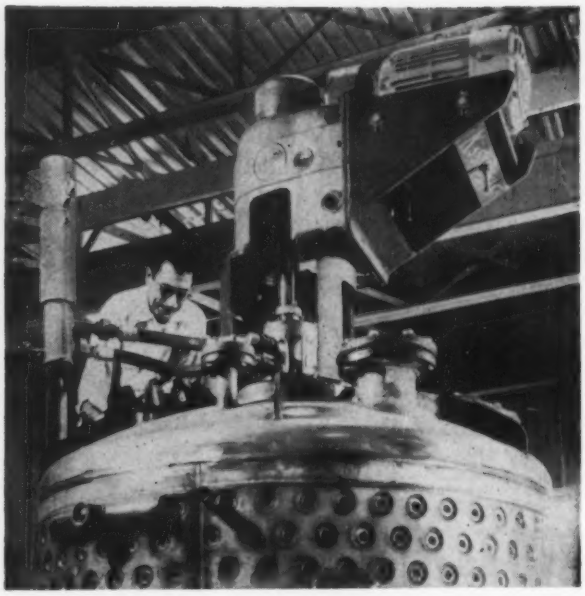
The commercial $100,000 General Electric machine will be based on Dr. Perry's system. Others which might be used are International Business Machine Co.'s model IBM 604 and the Eastman Kodak Co.'s Minicard. Most will probably be leased.

GE has a computer system, IBM 704 at its aircraft gas turbine plant near Cincinnati devoted exclusively to jet engines. The major difference in Dr. Perry's unit and the electronic unit is speed. Dr. Perry's punched tape unit depends on relays with a reaction time of about 0.015 seconds. The transistorized unit reacts in microseconds.

PLAIN TALK: A precise, standardized language must be used in transferring abstracts word by word to punched IBM cards.



MULTI-LINGUAL TAPE: Encoded information from IBM cards is transferred automatically to punched paper tape. If other countries adopt the same code for words, it could be read back here in English.



NEW: Glass-lined steel pipe that can be cut in the field, and dimple design on a stainless steel reactor that cuts material costs 20 pct are two new items The Pfaudler Co. is offering to Chemical processers.

Metals Hold Chemical Markets

Despite serious challenges metalworking still is the big supplier to chemical companies.

Why? Stepped up flow of new alloys and equipment.—By F. J. Starin.

▪ On the third floor of the New York Coliseum last week American Messer Co. was showing its cryogenics (ultra-cold) systems. Right next to it, Baird - Atomics Inc. burned a 5000 degree F open flame to demonstrate its direct reading flame photometer.

This pattern of extremes was evident elsewhere in the 27th Exposition of Chemical Industries.

Metals Showcase—Dean Brothers Pumps, Inc., was showing its pH pumps in titanium, zirconium, and 15 other alloys. Fansteel Metallurgical Corp. demonstrated the advantages of tantalum for such items as condensers, expansion joints, heat exchangers, bayonet heaters.

And it looks like the tried-and-true ball mill, used for decades by industry to grind everything from ore chunks to talc has competition. Southwestern Engineering Co. says its newly-developed Vibro-energy mill will do a better, faster job.

Stainless Popular—Yet, in the face of all this new material and equipment, the old standby—stainless steel—turned up in more applications than ever—pumps, controlled atmosphere enclosures, flanges and fitttings, tubing, fasteners, and porous sheet made by Pall Corp. with a powdered metal process.

Metalworking executives at the exposition say their industry, as a leading supplier to chemical processors, has been besieged from two sides in the last few years. Processors have been asking for improved materials and equipment. And makers of other materials have been scrambling for a bigger share of the market.

Judging from what they brought with them to show, metalworking has met the challenges — with finesse.

Successful Blends—A number of marriages have been made to get the best properties of several materials. For instance, in response to demands for pipe that was strong, more corrosive resistant, and easily handled in the field, the Pfaudler Co. came up with Glasteel pipe—a combination of steel and glass. The glass lining reportedly doubles the service life of other attempts in this direction and can be cut with standard metal cutting saws.

In some cases different metals have been combined to advantage. Lead has been used to line steel pipe, and to cover copper tubing.

Ahead of Demand—In equipment, metalworkers may well have moved ahead of demands from chemical processors. For one, Crossely Machine Co. introduced a free-piston pump with no moving parts which "provides 100 pct efficient positive displacement of any substance that will flow." And the company says it will run indefinitely.

Color TV Sales: In the Black?

More Manufacturers Are Going Into the Field

Color TV manufacturers are hoping sales will start a steady permanent upward climb in 1960.

But relatively economical sets are still a few years away.—By K. W. Bennett.

▪ "Color television isn't a light that failed. It's just a light that never lit," a veteran of the color TV struggle comments.

But color television set sales are rising. Reports of sellouts of some lines are gaining. Admiral, which eased back into color production at mid-year, indicates it will exceed its sales forecast by 35 pct. RCA confirms that color set sales are pushing with unexpected force. One vice president is betting 1960 will double the estimated 80-115,000 sets marketed this year.

New Entries—Best indicator that color television is beginning to move with new impetus is the trade report that two, perhaps three, new entrants will begin production of color sets in 1960. Industry veterans are watching Motorola, General Electric, and Zenith for indications that these could be the three. It's thought this could spell a $1.5 million capital expenditure; to launch three producing lines, exclusive of promotion and design costs.

All of these companies deny any immediate intent. But as one source put it, "A year is a long time in the TV industry."

Among present producers are RCA, Admiral, Magnavox, Hoffman Electronics and Packard Bell. Sylvania produces a limited number of sets with little promotion. Philco, Du Mont, General Electric, and others, have production know-how but have been inactive.

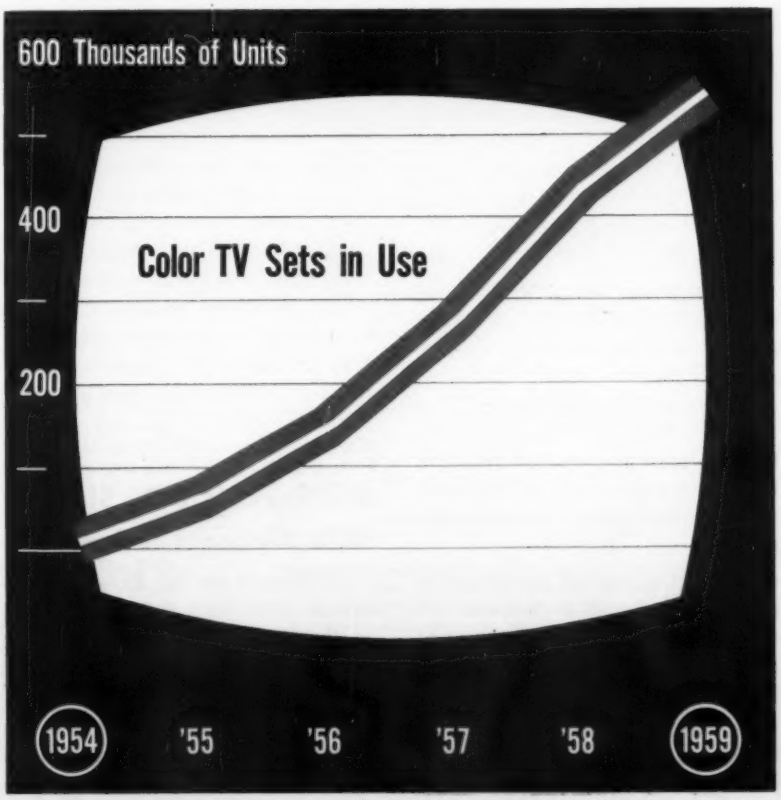
Backstage Scene—Again, despite the low level of on-stage activity, there is action backstage. Nearly all firms with color TV experience are experimenting. Main area of attack is the color tube. The current color tube uses three electron guns, one for each primary color that flashes on the screen. Researchers are working on three gun, two gun and even one gun tubes. At least two one-gun tubes have been used in the past, but haven't spread widely.

Lower Price—One researcher already argues, "We figure our set would currently have to retail at $600. (Units sell as low as $495.) A black and white set may cost only $200. We can't equal that, but we can see a one-gun tube, in a set that will retail at $400. At a guess, it's two years away. At that price, we may have the break we've been waiting for."

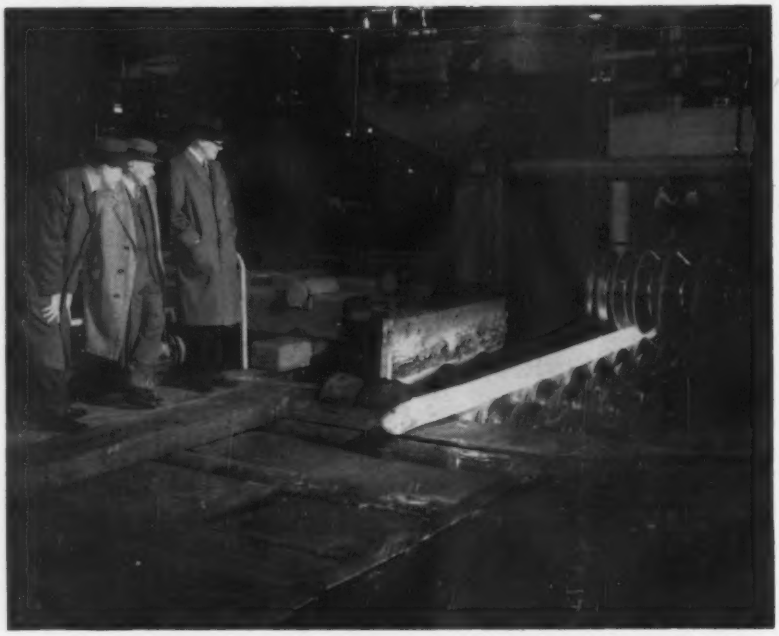
After five lean years, electronics makers are guarded even in hoping. What caused the 1959 sales breakaway? Five years of RCA color promotion, says an RCA competitor. Prices are approaching the magic $500 per set that brings buyers, according to a second.

Color set makers, burned by past forecast that failed, aren't calling the 1959 sales spurt a breakthrough. But they'll admit a 1960 sales level of 200,000 units is possible. This is a small fraction of total television set sales. But it's also the point at which black and white TV stood just a decade ago.

TV Viewing Is More Colorful



Millions Make Milestones



PRIZE POUNDS: Latrobe Steel Co. recently produced its 300 millionth lb of desegatized tool and die steel. Witnessing the cogging of the ingot, with the 300 millionth lb, are left to right; W. G. Dahl, Latrobe vice president, sales; M. W. Saxman, president, and J. E. Workman, executive vice president.

Industrial Diamond Div. To Speed Shipments

Immediate shipment of industrial diamonds from U. S.-based stocks will now be possible through establishment of an Industrial Diamond Div. by Englehard Industries, Inc., Newark, N. J.

Announcing the entrance of Englehard into this field, the company points out that the new division will provide, for the first time, a substantial stock of industrial diamonds in the U. S. "This will establish the same buyer-seller relations in this market as exist in the market for other major industrial materials."

As soon as market needs can be established, the new division will supply specific sizes of diamond grit. Until now, most users have bought ungraded materials. This naturally included grit sizes unusable for specific applications. Englehard will supply both regular natural grit and treated types which have proved superior in certain industrial areas.

The company will maintain a 10-day delivery and payment arrangement. In the past most buyers have had to supply cash in advance. Then came a wait for shipment from De Beer's London office. Englehard announces it is carrying on an extensive research program to study new applications of industrial diamonds. It is also searching for more efficient practice in existing uses.

Air Force's B-70 Slash Hits Aircraft Industry

Slashing of the Air Force budget for the 2000 mph B-70 from $160 million to $75 million last week was a major blow to the heavy bomber industry's most glamorous contender to date. For suppliers, too, it is a major setback although there have been rumors for months since the companion F-108 fighter was cancelled in late September. It could be the last stand for manned bombers.

The B-70 (nicknamed the Valkyrie) will be built by North American. Whole new techniques and materials have gone into its development, stainless steel silks for aft delta wings, 6 jet engines, electrochemically milled landing gear parts, a new navigation and bombing instruments for operation from 70,000 ft altitudes and others.

Up to 18,000 firms are involved in the B-70 and F-108 programs. Major subcontractors are GE for engines; IBM bomb-navigation and Sperry Gyroscope, gyro - platform and Cleveland Pneumatic Industries, landing gear.

Budd to Expand Gary Plant

Big expansion of its autobody plant at Gary, Ind., is being planned by The Budd Co. The move is being made to keep pace with recently announced increases in body-assembly and car building capacity at American Motors Corp.

Budd directors approved the second phase of a $5.5 million program covering expansion of press, assembly and shipping areas at Gary. This phase will be carried out in 1960. It will include addition to the building expansion, a new underbody assembly line, additional welding equipment, new press equipment and enlarged shipping facilities.

Talk Isn't Cheap

The government's financial investigator—the huge General Accounting Office—shows no signs of lessening its campaign against what it calls "excessive" contractor costs.

Recently, the GAO attacked the American Telephone & Telegraph Co. for "overcharging" government departments and agencies. GAO says the government is paying $1.2 million a year too much for telephone service.

WE DARE YOU TO TRY THIS

. . . with anything but a Clearing-Axelson Blue Chip Lathe

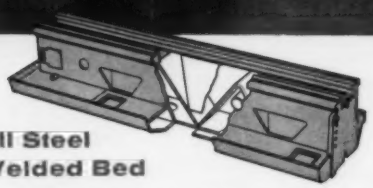
A spine smashing test—Yet we got precision results on this ¾" cut under conditions that would make any other lathe sway-backed.

Why bother to run a lathe suspended in air? Only to demonstrate the incomparable rigidity of the welded steel Clearing-Axelson Blue Chip lathe. This rigidity is absolutely permanent; it will maintain the precision of this machine through years of the most severe service.

And why, you may ask, is such enormous rigidity important?

Well, a lathe that can whistle its way through the toughest alloys yet provide vibration free operation has to be rugged. The Blue Chip lathe turns out more accurate work, faster—even when hogging off metal at a clip you would have thought impossible up to now. More horsepower permits use of latest tools—smooth, effortless operation saves you money on tooling.

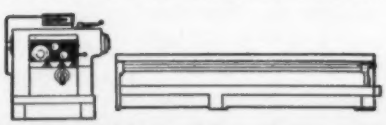
Clearing also manufactures the Clearing-Harrison lathe, presses of all types, dies and special tooling, and special equipment for the aircraft and missiles industry.



All Steel Welded Bed

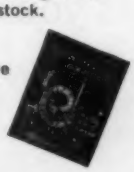
Stronger steel plate provides strength where it is needed. Pyramid shaped reinforcing ribs are used the entire length of the bed for high torsional rigidity.

Modular Bed Construction



Headstock and bed on Blue Chip Lathes are built as separate units. Both are all steel weldments, fully stress relieved, and both are built-to-the-floor. That's how the Blue Chip lathe can laugh at obsolescence. Need a larger bed? Order a new bed but keep your existing headstock.

All the facts on the Blue Chip line of lathes are in this catalog. Write for your copy today.



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Harry Emerson Sloan

He Helped Build an Industry

Harry Emerson Sloan started with the Cushman Chuck Co., Hartford, Conn., 60 years ago as a mechanic.

Today, he is chairman of the board and responsible for many advancements made in the industry.

HARRY E. SLOAN: "There's always a better way."

▪ Harry Emerson Sloan has been with the Cushman Chuck Co. for 60 years. At 19 he started as a mechanic. Today he is chairman of the board.

His success is attributed to his "natural ability in tooling and machining, developing new methods, and an inherent facility to lead men." These qualities were pointed out recently when Mr. Sloan was honored for his service to the company.

A Better Way—In earlier days, he possessed an inability to leave a problem unsolved. This he combined with an intense curiosity to "see how it works" and he was often found under or taking apart a machine to see if it could be improved. These characteristics moved with him from the shop when he became a part of management.

As a member of the management team, he would pay short but frequent visits to the plant. "They are necessary," he says. "One has to continually re-examine the manufacturing process. There is always a better way."

Profitable Tours—Mr. Sloan says the factory tours not only pay off in better operating methods, but they do a great deal to develop good relations between workers and the company. Even as chairman of the board he frequently makes tours of the plant. He knows and calls the older machinists by their first names, and they, in turn, call him Harry.

Being an engineer, Mr. Sloan is interested in the "specials" being designed in the Cushman Engineering Department. Many of those now in the files were developed from his basic ideas.

Foresight—As an administrator, his associates say he is efficient and exacting. As an engineer, they point out the company's steady growth to where it is a leading manufacturer of chucks. Typical of Mr. Sloan's foresight is his insistence that the company acquire a complete line of air-operated chucks. He quickly saw the vast savings effected through the use of power chucking.

At his direction, and under his engineering guidance, many of the machines at Cushman were equipped with air chucks well before their general acceptance.

About his early days with the company, Mr. Sloan says, "It was 10 hours a day Monday through Friday. Saturday was a short day, only nine hours—and no overtime."

Industrial Dean—Now, at 79, he comes to the plant on an irregular basis. But until a few years ago his workday started with the factory gang and ended only when his work was done.

how to rustproof cold rolled steel in shipment and storage

Proved by actual test! Unwrapped steel rusted within a few hours. Identical steel wrapped in Ferro-Pak showed no signs of rust . . . even after several months. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong, yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, **180 N. Wabash Ave., Chicago 1, Illinois.**

How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.

How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

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No Simple Way to Cut Turnover

There's no easy blueprint to follow in cutting employee turnover, survey points out.

Helpful are careful testing of job applicants, better training, and study of reasons why workers quit.

▪ At times you've probably worried about your labor turnover rate. It's a tricky problem. And one difficult to solve.

Any company looking for an easy blueprint to follow in reducing turnover is "doomed to disappointment." That's the conclusion of a new research study put out by the American Management Assn.

Some Suggestions — The study was conducted by Dr. Frederich J. Gaudet of Stevens Institute of Technology. It found that methods which helped one company didn't work for others. But some devices for cutting turnover did turn up in a number of cases.

These included psychological testing, better on-the-job training, and better plant communication. Also helpful: Careful study of the reasons why employees quit.

Why They Leave—The hard part of attacking the labor turnover problem, the AMA says, is finding out why employees leave. Best source is the "exit" interview as employees are separated. This final talk may actually salvage some intended quits. It also gives management clues on how to correct employment defects.

Getting at the real reason why an employee leaves is difficult. Often the real reason may be concealed—or even unknown. One useful technique turned up is the post-terminal interview. Workers who have already left are asked again their reason for leaving.

Change of Mind—One employer found a change when these answers were tabulated. During the exit interview, external factors were given as reasons for leaving—other employment, desire to re-locate in another area, filling military duties, etc. On the post-terminal report, however, "internal" factors, those under management's control — showed up. Listed were such factors as poor pay, bad supervision, and slow advancement.

The survey gives business this caution: Don't ignore economic conditions in analyzing methods for controlling turnover. Improvements may actually be due to a dip in economic conditions. Almost any method introduced to reduce turnover as a business decline begins will probably show a lowering in turnover.

Inventory Buildup Important

▪ Inventory rebuilding will be an important stimulant to early 1960 business.

This conclusion is clear when you trace the course of inventories since the 1958 recession. Book value of inventories (on a seasonally adjusted basis) reached their low point of $49.2 billion in November, 1958. From there they advanced to a high of $52.2 billion this July.

Up, Then Down — During the April-June period, businessmen were adding to stocks at a $10.4 billion annual rate. In the third quarter they reduced stocks at a $1 billion rate.

The reductions went on through October and early November. And the Taft-Hartley halt to the steel strike has not prevented further inventory reductions.

During October, the Dept. of Commerce reports, book value of manufacturers inventories dipped $½ billion. The previous month the decline was only $200 million. The October decline centered in stocks of durable goods. These dropped off $600 million—mainly in the auto and fabricated metal industries.

Try The Impossible—Steel users are absolutely out of steel and will have to built inventories, the National Assn. of Purchasing Agents reports in its latest survey of members. And many buyers are trying to do the impossible and enlarge stocks against a possible second shutdown in January.

More Than Seasonal Decline in Building

Construction declined more than seasonally during October, Commerce reports.

Total value of work put in place was $4.8 billion, 5 pct less than September. The October total this year was still 2 pct above the level for October, 1958.

Private construction dropped to $3.4 million in October this year, as against $3.5 million the previous month. Public construction was down to $1.4 million, from $1.5 million in September.

M&T's chromate dip finishes protect and beautify at nominal cost

REDS, GREENS, BLUES, GOLDS — these lustrous metallic colors for zinc-plated products join the line of UNICHROME CHROMATE DIPS which also includes chromium-like clear, jet black, and iridescent yellow finishes.

The new dyed chromate finishes are especially suitable for appliance parts, toys and similar items . . . where the eye appeal of a striking metallic tint adds potent sales appeal. Wire objects in particular take on new beauty and at low unit cost. Enthusiastic users of Unichrome Dips have found that their material costs for chromate treating are only a small fraction of a cent per square foot of surface treated.

Along with color goes a high degree of corrosion resistance — the highest among dyed chromate finishes. In salt spray tests, Unichrome Dip Finishes have prevented appearance of white corrosion for as much as 100 hours. A clear lacquer top coat gives a combination finish with excellent wearability . . . as proved by over a dozen years of successful commercial use of clear Unichrome Dip finishes on refrigerator shelves and builders' hardware.

Ask the M&T man to tell you more about these chromate type finishes. Or send for details.

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CAMERA CATCH: A high-speed camera crew photographs a Pontiac crashing into concrete blocks during crash tests at GM Proving Grounds near Detroit. Cameras aid engineers in all phases of testing.

If It's Too Fast for Human Eyes—

High-Speed Camera Will Spot Engineering Flaws

The use of high-speed cameras has helped General Motors engineers see how intricate parts operate.

The system of catching the parts in motion has led to development of better designs.—By A. E. Fleming.

▪ A group of photography wizards just outside Detroit is proving to automotive engineers that the camera is quicker than the eye.

In charge of performing the motion picture sorcery is R. O. Painter, head of the Engineering Photography Dept. at the General Motors Proving Grounds at Milford, Mich.

Magic Lantern—He and a small staff of assistants use high-speed cameras in a magic lantern sort of way. The cameras—which perform as time microscopes in the study of rapid motion—can record up to 16,000 pictures, or frames, a second on film. Cameras used by the average home movie maker operate at 16 to 48 frames a second.

Unlike regular cameras with traditional open-and-shut shutters, the highspeed camera has a constantly revolving prism lens which projects the picture image onto a constantly moving film. Lens and film speeds are synchronized.

Keen Eye—This super speed is helping GM's engineering and production people develop new products and improve present ones. "Our engineers might want to know how efficiently a certain fast operating part works in an engine," explains Mr. Painter.

"They can't tell by looking at the part in action with the naked eye because it moves too quickly. So we make a high-speed motion picture of the action. Then we project it to slow motion with a time and motion study projector and show the engineers exactly what the part looks like and does when it's moving at hundreds of revolutions a second. On film the part looks like it's barely moving."

Barely moving is right. Looking through a quartz window, the explosion in an engine's combustion chamber is a lazily flickering flame in one of Mr. Painter's time studies. The contact points in an auto horn, vibrating 320 times a second, seem to be floating lightly in space.

At top speed, Mr. Painter's $1800 high-speed cameras (there are seven at the proving grounds) can reel off a 100 ft roll of film in 0.8 of a second. The film can shoot from a standstill to a rate of 16,000 frames a second in one-half second. When it reaches the 16,000 frame point it's traveling about 135 mph.

High-speed photography has been used as an engineering tool at GM's Proving Grounds for more than 20

years. Currently, about 125,000 ft of finished film are turned out annually. Most of it is black and white 16 mm. Some of it is color film, some 8 mm.

Big Load—Mr. Painter needs a station wagon to carry the gear he uses for a single assignment. Included are cameras, spotlights, transformers, light measurement instruments, filters, extra lenses and extensions, timing units, mirrors, gages, flash units and oscillographs.

There is a strong tendency in highspeed photography to neglect the planning and preparation of the movie subject, according to Mr. Painter. "We're often working with engineers from various divisions on mechanisms with which we aren't familiar. We try to determine, though, just what parts of the mechanism must be seen and precisely what information we are seeking. If movements are to be measured, timing and scaling are necessary. If only tiny movements are expected, every effort must be made to reduce the field covered by the camera."

Mr. Painter emphasizes that a basic rule he follows is to restrict the camera field to only that part which is absolutely needed to show action. "Some photographers try hard to show the entire engine when only the action of a valve spring is under study," he points out. "It's obvious that movements of a few thousandths of an inch can't be observed in a field five inches wide. Yet just that sort of thing is expected by many people who want highspeed motion pictures taken."

Long Process—There is more to highspeed photography than taking the picture, he says. Often the camera work may last only a half hour. But setting the stage for the job may take several days.

Photographing moving vehicles and various parts on them, such as suspension members, accounts for about 20 pct of the proving grounds' highspeed film footage. Setting up the car for such a study is a trick in itself. In one case, the camera was mounted in the trunk of the car. A mirror was used to get a view of the rear spring and shock absorber. Fog lamps illuminated the spring from under the car. Batteries powered the lights and the camera. An overvoltage of 75 pct was applied to boost the illumination intensity.

Centering Subject—A second way to photograph moving vehicles involves setting up the camera alongside a roadway and either following the vehicle by panning the camera or letting the vehicle pass through the field of the camera.

The most common method, however, involves a car to carry the camera. It runs alongside the subject vehicle as the picture is taken The camera is sighted on the subject through the use of a simple sighting arrangement. The camera starts operating when the subject is properly centered in the sight. Since the time involved in running the film through the camera is only a few seconds, no great difficulty exists in keeping the subject in view once it is lined up.

Bottom View—One of the more special problems for the highspeed camera was photographing the action of a tire as a car accelerated from a standstill. Mr. Painter decided it could be done properly only one way. This was by taking the picture from underneath a heavy plateglass surface on which the tire rested. Although the coefficient of friction between plateglass and rubber is somewhat different from normal road surfaces, the general behavior of the tire tread proved quite informative.

In studying combustion in a gasoline engine, the highspeed camera's principal aim has been to get films of the progress of the flame front during both knocking and nonknocking combustion and to observe carbon particle formation.

Point the Way — The study of valve spring and valve motions in engine work has also been simplified by highspeed photography. Engineers familiar with valve train design say no other method is available for checking valve motions as accurately.

In carrying out these and similar assignments, Mr. Painter and his staff have been instrumental in many product improvements.

The Bull of the Woods

OH, IF I COULD ONLY WRITE! THERE'S A GREAT SHORT STORY RIGHT THERE--GUY'S ABOUT TO GET FIRED FER SPOILIN' AN EXPENSIVE JOB--JUST AT THE RIGHT MOMENT HIS TRUSTY PAL OPENS THE DOOR, TH' BOSS SEES HOW TERRIBLE IT IS TO TURN A GUY OUT INTO THE COLD, AND HE DON'T GIT FIRED!
THAT'LL BE ALL RIGHT IF HE DON'T ASK THE TRUSTY PAL WHAT BUSINESS HE'S GOT OUT THERE--AND FIRE HIM BECAUSE HE SEEMS TO LIKE TO GO OUT THERE!
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It takes unusual facilities to machine and cut a 22-ft. ring gear weighing 44,000 lbs.

The Farrel generator, on which this gear is being cut, is one of the largest in the world.

This giant, 7-degree, single-helical gear will be used in a cement kiln. Cast of alloy steel, the teeth were precision cut on a Farrel gear generator. Machining consisted of turning, boring, planing and drilling.

Having a 22-foot outside diameter and a face width of 19", it well illustrates Farrel's unique capacity for cutting gears of this type. The company's machining facilities are also unusually complete and fully able to handle any type of work on the largest gears required.

The maximum size of Farrel generated-tooth gears, single helical and spur, is 23 feet diameter, 30 inches face. However, by alternate cutting methods this diameter limit can be greatly exceeded. Continuous-tooth herringbone teeth can be generated up to 23 feet diameter and 60 inches face; also, internal gears can be produced with either single helical or spur teeth, in sizes up to 23 feet external blank diameter, 20 inches face.

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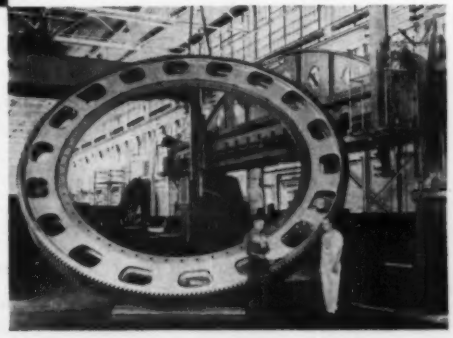
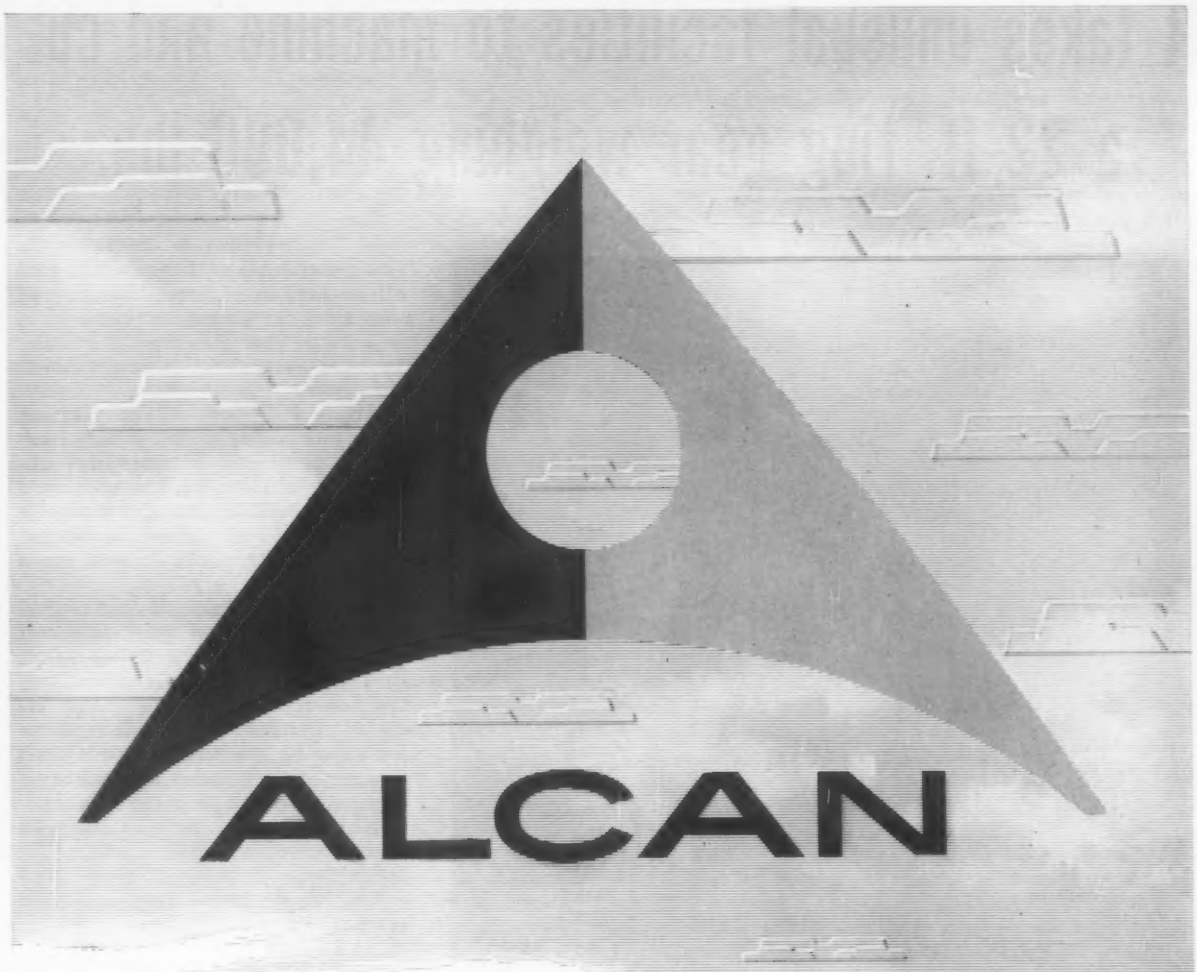


Another view of the gear, behind which can be seen a Farrel-Betts 42-ft. vertical boring mill.



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FINAL WORD? Will these Presidential board members and Federal Mediators* make the final settlement?

Washington Climate Favors USW

Unless a steel contract is reached by the T-H deadline, politicians may try to force a settlement.

With an election year coming up, Congress wants to avoid recession talk.—By G. H. Baker.

■ Slowly but surely, the steel strike is heading toward a government-dictated settlement.

President Eisenhower has warned industry and labor that if they cannot reach a settlement voluntarily, "then finally the government just cannot sit idly on its hands."

Sad Day Coming? — While he didn't indicate what action might be taken, he commented: "But I do believe that the day that we abandon free collective, honest free collective bargaining, it is going to be a sad day for the United States.

And there is no denying that government-imposed settlements, or settlements in which federal officials play a powerful backstage role, nearly always come close to meeting union demands.

Unless the Washington tide—which is now running against the companies—changes soon, the steel companies have lost their battle against inflation and featherbedding.

Many top government officials, long privately pro-union and now openly muttering against steel management, are using the weight of their federal authority to bring pressure against the steel firms.

Outmaneuvered — Republicans, faced with the difficult and expensive job of trying to keep control of the White House, plus the uphill fight to try to regain control of the Congress, are anxious to avoid—at almost any cost—anything resembling a recession in 1960.

How did the union officials manage to get the ball game going their way? In negotiations in New York and in Pittsburgh, the tide was running in favor of management.

The answer is simple: By adroit maneuvering and delaying tactics, they succeeded in getting the negotiations transferred to Washington.

*Seated, Federal Mediation Chief Joseph F. Finnegan. Standing, left to right, Board members Paul N. Lehozcky and Dr. George Taylor; Robert Moore, deputy director, Federal Mediation Service; Robert W. Donnaho and Walter A. Maggiolo of the Federal Mediation Service; and John A. Perkins, board member.

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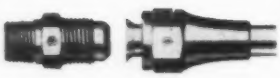

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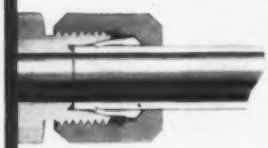

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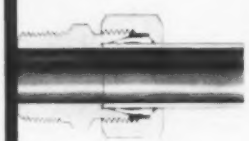

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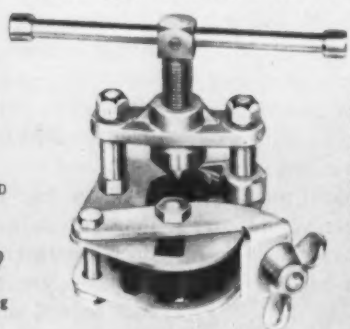

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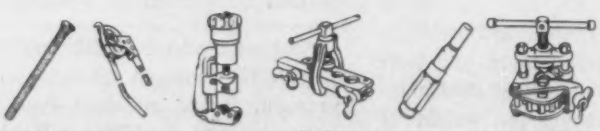

THE WEATHERHEAD COMPANY

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Will Budget Cuts Hurt Bomarc?

Missile Project Will Probably Get $400 Million

The Bomarc missile program appears safe from military budget cutting.

Project is a major part of Boeing's work at its Seattle plant.—By R. R. Kay.

▪ Disregard all the talk about a slash in the Bomarc missile program. It's a pretty good bet that the project is safe from military budget cuts.

As it stands now, the Air Force will spend $400 million on the missile during this fiscal year.

Boeing in Seattle makes the bird. If you want subcontract work, this might be a good time to go after it.

Prime Project—Making the supersonic ground-to-air Bomarc is now a major part of Boeing's work in their Seattle plant. President William M. Allen says 15,000 persons are working on the project. Employment on this grew steadily while overall company employment shrank.

The first Bomarc base became operational several months ago. Air Force Secretary James H. Douglas says 18 more are under construction: 14 in the East; 2 in eastern Canada; and 2 in the Pacific Northwest.

Work on the 707—Don't get the impression Boeing is moving completely out of the plane-building field. It's pushing hard to sell the 707 jetliner. The company needs orders for 50 more before it can show a profit.

Boeing claims a major breakthrough in the ramjet engine field. Propulsion research engineer Dale W. Brees designed one that, it's said, could propel a plane or missile 11,000 mph—16 times the speed of sound.

Engine Advantages—The engine features a novel airscoop. Claimed advantages: Simplified air inlets, reduced engine weight, maximum energy release rate, and more thrust per pound of engine.

Future use could be on global airliners, bombers, and missiles.

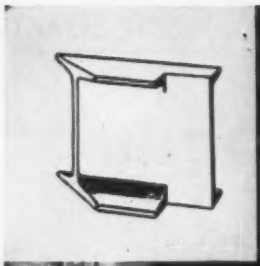
The big problem is that with all ramjets the engine must be boosted to a furious rate of speed before it will operate. Rocket boosters could be the answer.

Aluminum in the North

How important is the aluminum industry to the Pacific Northwest? Nearly $2 billion worth in the past two decades. The industry contributed $515 million in salaries, $38 million in taxes, $248 million in purchases, and $315 million in transportation charges.

Aging 20 Years – Underwater

56,000 "FLIGHTS": During five months of testing at Convair's San Diego plant, fuselage of 880 jet airliner "flew" the equal of 20 years. Pressures built up in water tank are greater than those of actual flight.

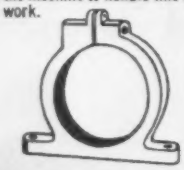


COPING AND MITERING HEAVY STRUCTURAL SHAPE

18" Beam (above) is held between vises for the short cut. On the long cut (left) vises were removed and beam held by simple clamp. The MARVEL Band Saw is truly indispensable in ornamental and structural iron shops where this type of work is done daily. The machine will cut-off square, miter and cope any work shape from the smallest moulding to 18" I-beams.

SPLITTING CLAMP RINGS, BUSHINGS

Splitting clamp rings, connecting rods, bushings and collets is a fast, simple operation on the No. 8 Band Saw. Perfect control, quick chucking facilities, accuracy and speed are features that especially fit the machine to handle this type of work.

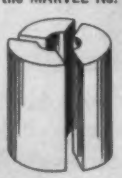


MITERING LARGE DIAMETER PIPE

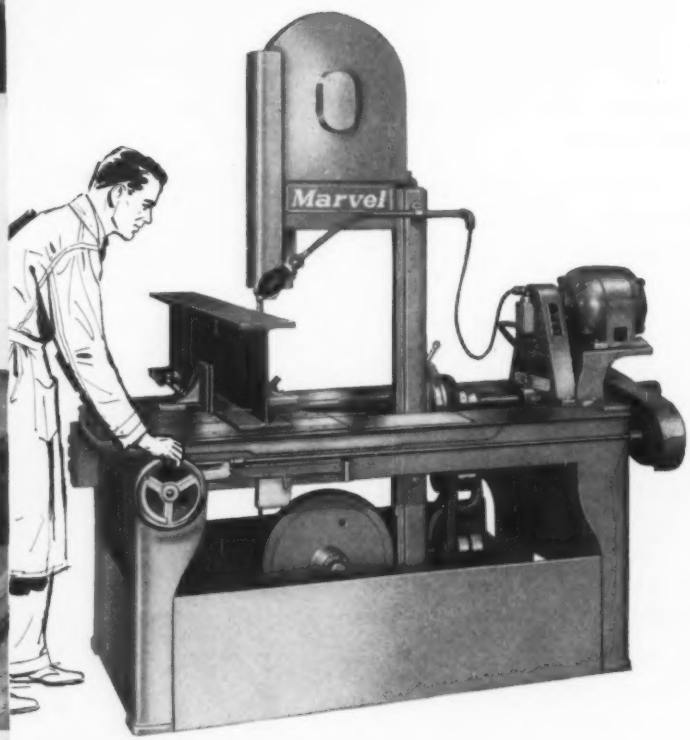
Pipe (or any bar shape) may be mitered at a 45° angle without the need for special jigs or fixtures. Even when cutting miters, work remains in the same position as it does for straight cuts. Column and blade are instantly tilted to desired angle, even without stopping the machine. Perfect miters (or lesser angles) are sawed without any layout or special equipment.

SEGMENTING LARGE DIE BLOCK

Three equally spaced re-entrant cuts were made in this 16" x 18" SAE 4130 Forging. Job was completed, floor-to-floor in 5 hours. No special jigs or fixtures were required. An unusual job that serves to emphasize the versatility of the MARVEL No. 8 Saw.



"The One Machine We Couldn't Do Without"



"As simple to use and handy as a Scout Knife" is the way another user described his MARVEL No. 8 Universal Band Saw recently . . . and we can't think of a better way to describe this versatile metal cutting machine.

With a MARVEL No. 8 Band Saw, you can do almost any conceivable straight, angle, or miter metal sawing job—from cutting-off bar stock to making the most unusual forming cuts. You can handle small, delicate work, and in the next minute, saw structurals, or segment large work as illustrated in the lower photograph. You will save time, labor, and material with a MARVEL No. 8 Band Saw because no other saw has all the features to be had in this truly universal tool.

Upright column design and forward travel of the blade through the work (which remains stationary on the table-height saw bed) provides easy, unobstructed visibility and more convenient and efficient working conditions; column can be tilted and locked at any angle up to 45° left and right of vertical; the exclusive MARVEL Power Feed with Automatic Overload Relief; Automatic cutting-depth stops; simple, convenient operating controls—these are some of the features which make the No. 8 Band Saw the most useful—and used—metal cutting saw on the market.

For the complete story, ask or write for Bulletin 875 which illustrates and describes MARVEL Universal Metal Cutting Band Saws.

MARVEL Metal Cutting SAWS
Better Machines-Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 N. BLOOMINGDALE AVE. • CHICAGO 39, ILL.

Why the Big Boom in Presses?

New Features Lure U. S. Users, Export Also Booms

Big orders from automotive and appliance industries result in big jump in forming tool orders.

Big European manufacturers also want U. S. presses, for efficiency and delivery.—By R. H. Eshelman.

■ By the end of October orders for cutting machines were dropping, presumably from delayed effects of the steel strike. Meanwhile sales of presses and other metal forming tools were booming along at the highest rate for the year.

Orders were also pouring in from abroad for American presses. Foreign manufacturers were showing interest in metal cutting machines too, enough to sustain previous levels of orders, at least.

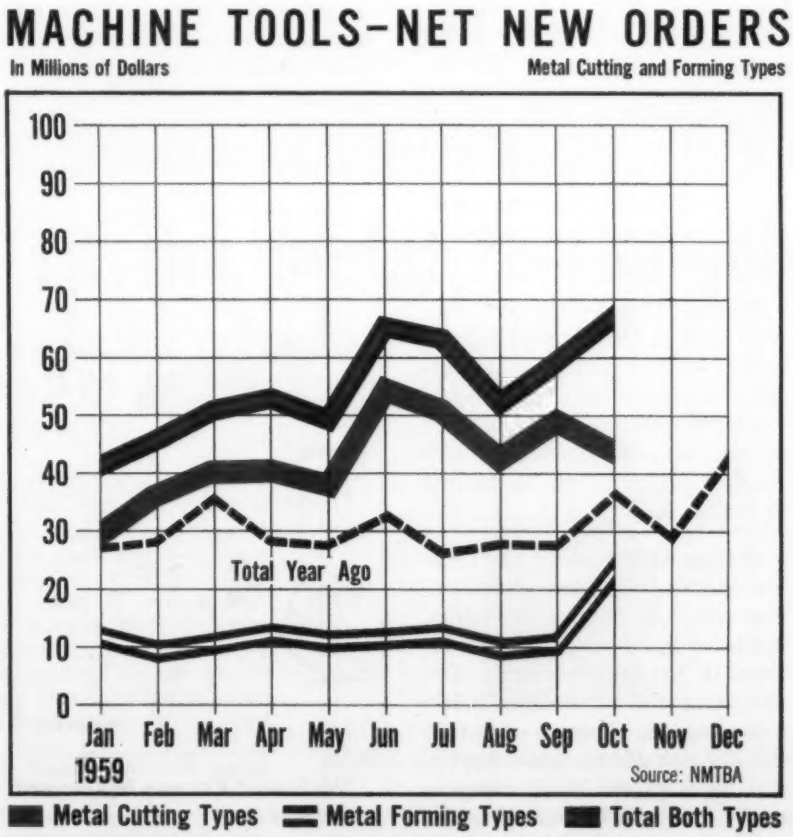
Push for Presses—What's behind the sudden revival of interest in metal forming equipment? Insiders say it stems from two factors. One is rapidly growing acceptance of the sliding bolster (see IRON AGE, P. 47, Dec. 25, 1958). It's reliably reported that Fisher Body has underway a vast press modernization program that hinges on the greater utilization possible with this type. A production engineer says one plan calls for setting up a new line of these presses alongside an older one for direct comparison of outputs.

Size of the program can be estimated by the report that total capital expenditure in one Fisher plant alone will run well over $5,000,000. A spokesman for the G. M. division confirms that the thing is mushrooming. He declined comment on totals at this time, noting that each plant is responsible for its production planning. He admitted, however, that overall dollar estimates jump almost daily as more plants reveal their plans.

Appliances Move In — Second area of optimism for metal forming equipment is in integrated lines for appliances. These new automation operations may incorporate blanking, notching, coining, roll forming, welding, expanding and miscellaneous jobs in one mechanized line.

Westinghouse apparently stole a march on the industry with a number of static-controlled transfer lines (for the laundromat and electric ovens). Maintenance dropped; production efficiency zoomed. Now other appliance makers are trying to leap-frog ahead with even more advanced automation.

Export Market—Meanwhile, industry observers forecast an even bigger boom in press orders from European automotive producers. They seem to want two things: One is American production know-how. The other, quick delivery. Big producers like Volkswagen, Opel, Renault and the British motors group complain privately that deliveries on European presses are quoted over two years off.



INDUSTRIAL BRIEFS

Liaison Consultant—On Jan. 1, 1960, Dr. Robert F. Mehl, Dean of Graduate Studies, and head of the Dept. of Metallurgy at Carnegie Institute of Technology, will become a consultant for scientific liaison between U. S. Steel's research organization and various universities and research institutes in Europe.

Chicago Merger — The firm of John A. Patton Management Engineers, Inc., has merged with George Fry & Associates, Inc. New address is The Field Bldg., 135 S. LaSalle St., Chicago.

New Arrivals—Five of Britain's best known lines of machine tools will be sold and serviced in the U. S. by a newly formed subsidiary of Lapointe Machine Tool Co. J. J. Prindiville, Jr., president of Lapointe, will also serve as president of the new subsidiary, Lapointe Machine Co.

Fine Size—New facilities at the Calcite Plant of Michigan Limestone Div., U. S. Steel Corp., Rogers City, Mich., will increase production of fine-sized limestone known as "Fluxing Fines." This product is used as a partial replacement for large lump flux stone normally used when natural raw ore is used in the blast furnace.

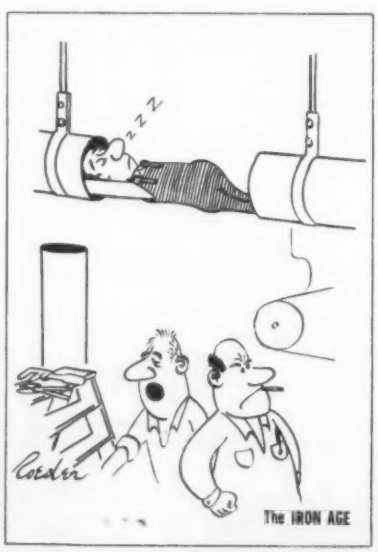
Professor Cited—The new machine Design Award was presented to Charles E. Crede associate professor of mechanical engineering at California Institute of Technology by the American Society of Mechanical Engineers. He is the first to receive the award.

Foreign Outlet—Jones & Lamson Machine Co., Springfield, Vt., acquired Le Progres Industriel, builder of quality machine tools, located in Lot, near Brussels. The new company, Le Progres Industriel-Jones & Lamson Machine Co. will manufacture and sell products made by the U. S. company in the European Common Market.

More Metallurgy—A new metallurgical firm, Armetco, Inc., has been formed in Wooster, O. Armetco has purchased the plant and facilities formerly owned by Johnston & Funk Metallurgical Corp. The Wooster facility has been a major producer of wire and special mill shapes in titanium and zirconium. Armetco, Inc., is located at 776 Kemrow Ave., Wooster, O.

Phenol Plant—The Dow Chemical Co. will build a phenol plant with a capacity of 36 million lb per year in the Pacific Northwest. It will be built at a site still to be selected at Puget Sound, or in the Longview, Wash., or Portland, Ore., area. Several million dollars will be spent on property development and building before operations begin in 1961.

On Bearings—The Fafnir Bearing Co., New Britain, Conn., and The Timken Roller Bearing Co., Canton, O., will conclude an agreement by which Fafnir will purchase The Fischer Bearings Co., Ltd., a Timken British subsidiary. Fischer is the fourth largest bearing manufacturer in England and will concentrate on Timken's principal product, tapered roller bearings.



"McFester? I'm sure he's around somewhere."

Long Train—The Louisville and Nashville Railroad Co. has ordered 2600 roller bearing freight cars from the Bessemer, Ala., plant of Pullman-Standard Car Manufacturing Co. Total cost is $27.1 million. The order consists of 1700 open top 70-ton hopper cars and 900 gondolas.

Advisor Named—H. G. Magnussen, has been named adviser to the director, Metalworking Equipment Div., Business and Defense Services Administration, U. S. Dept. of Commerce. For many years, Mr. Magnussen, has been an official of the Lindberg Engineering Co., Chicago.

South of the Border — Kaiser Aluminum International and Guillermo Decker S. A., manufacturer of nonferrous metal products in S. A., are forming a new company in Argentina. The aluminum fabricating plant will be known as Industrias Manufactureras Del Alumino S. A. Kaiser Aluminum's interest will be 49 pct and will invest more than $3 million in the new company.

All in One—Servocontrol, a Div. of The Oilgear Co., Milwaukee, has recently transferred operations to a new plant at 160 Bear Hill Rd., Waltham, Mass. The facility includes: Electronics lab, hydraulic lab, a machine shop, and a model shop and drafting area. Complete electro-hydraulic systems can be designed, built and tested in this plant.

In Detroit—Aetna Ball & Roller Bearing Co. will open on Jan. 1, new Detroit sales offices at 14631 West McNichols (Executive Bldg). Aetna had been represented in the Michigan area by the S. T. Keller Co. The change now brings direct sales representation.

Spring Canning — National Can Corp.'s new plant at Hanover, Pa., will be ready for production in the second quarter of 1960. It is one of three new National Can plants now under construction. The plant will have a production capacity in excess of 15 million cans weekly.

Revere helps "fit the metal to the job"

AND A MAKER OF MEDICINE CABINET MIRROR FRAMES SAVES $10,000 A YEAR

As a result of a suggestion made by one of Revere's Technical Advisors, a maker of mirror frames for medicine cabinets has saved $10,000 a year on polishing costs alone. The suggestion was that, by changing to a brass of different grain size, the manufacturer might be able to save money on polishing costs and at the same time improve the quality of his product. (The 90° bend to which the mirror frames are subjected also had to be taken into consideration.)

Samples were made using a Revere Brass Strip with a smaller grain size as recommended by the Technical Advisor. Tests showed that, as a result of the change the manufacturer was able to realize a saving of 17¢ per mirror frame on polishing costs alone, with no increased costs in other operations, including the 90° bend. Based on the saving per frame this manufacturer has saved $10,000 per year for the past 4 years!

Here is still another example of how Revere's Technical Advisory Service working with the customer and the mill helped "fit the metal to the job," thus saving the customer money as well as improving product quality.

Why don't you take advantage of the extensive knowledge of Revere's Technical Advisory Service in "fitting the metal to the job?" It's entirely possible this service can save you money . . . help improve the quality of *your* product.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Avenue, New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Fort Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

E. W. Morris, elected treasurer, Bethlehem Steel Co.

General Motors Corp. — **P. J. Monaghan,** appointed vice president, process development staff; **C. J. Werner,** appointed general manager, GMC Truck & Coach Div., Pontiac, Mich.; **N. L. Gebhart,** appointed general manager, Moraine Products Div., Dayton, O.

Scaife Co.—**J. R. Pauline,** promoted to vice president, manufacturing.

Amsler Morton Co. — **C. R. Eisenschmidt, Jr.,** becomes president; **E. P. Williams,** named vice president, administration.

A. B. Blackledge, name vice president and asst. manager, Cameron Iron Works, Inc.

Aro Equipment of Canada Ltd.— **K. H. Zinsmaster,** promoted to vice president and general manager.

Overly Manufacturing Co. — **H. W. Wehe, Jr.,** promoted to executive vice president.

Hooker Chemical Corp., Durez Plastics Div.—**H. B. Puff,** appointed manager, field sales, and **R. W. More,** appointed asst. product manager, resins; **R. S. Tanner,** appointed Division controller.

J. W. Brougher, named vice president and manager, Special Products Div., Cameron Iron Works, Inc.

NRC Equipment Corp.—**R. H. Binkerd,** appointed general sales manager, Newton, Mass.

Selas Corp. of America—**E. A. Cook, Jr.,** appointed chief engineer.

Reynolds Metals Co.—**R. F. Thompson, Jr.,** promoted to manager, appliance and equipment market.

Denison Engineering Div., American Brake Shoe Co.—**F. L. Donnally,** becomes engineering consultant.

Elliott Co.—**J. R. Phillips,** appointed Washington district manager.

R. E. Lauterbach, elected vice president, sales, Pittsburgh Steel Co.

Linde Co. — **T. F. O'Connell,** appointed general sales manager, Distributor Products Dept.

Harbison - Walker Refractories Co.—**H. A. Bednarski,** promoted to asst. manager, basic sales, hearth materials and **K. E. Hansen,** asst. manager, basic sales.

Riverside-Alloy Metal Div., H. K. Porter Co., Inc.—**H. S. Angell,** appointed manager, market research and sales training; **W. V. Clipsham,** named sales office manager.

Link-Belt Co.—**W. J. Mitchell,** named district manager, Portland, Ore.

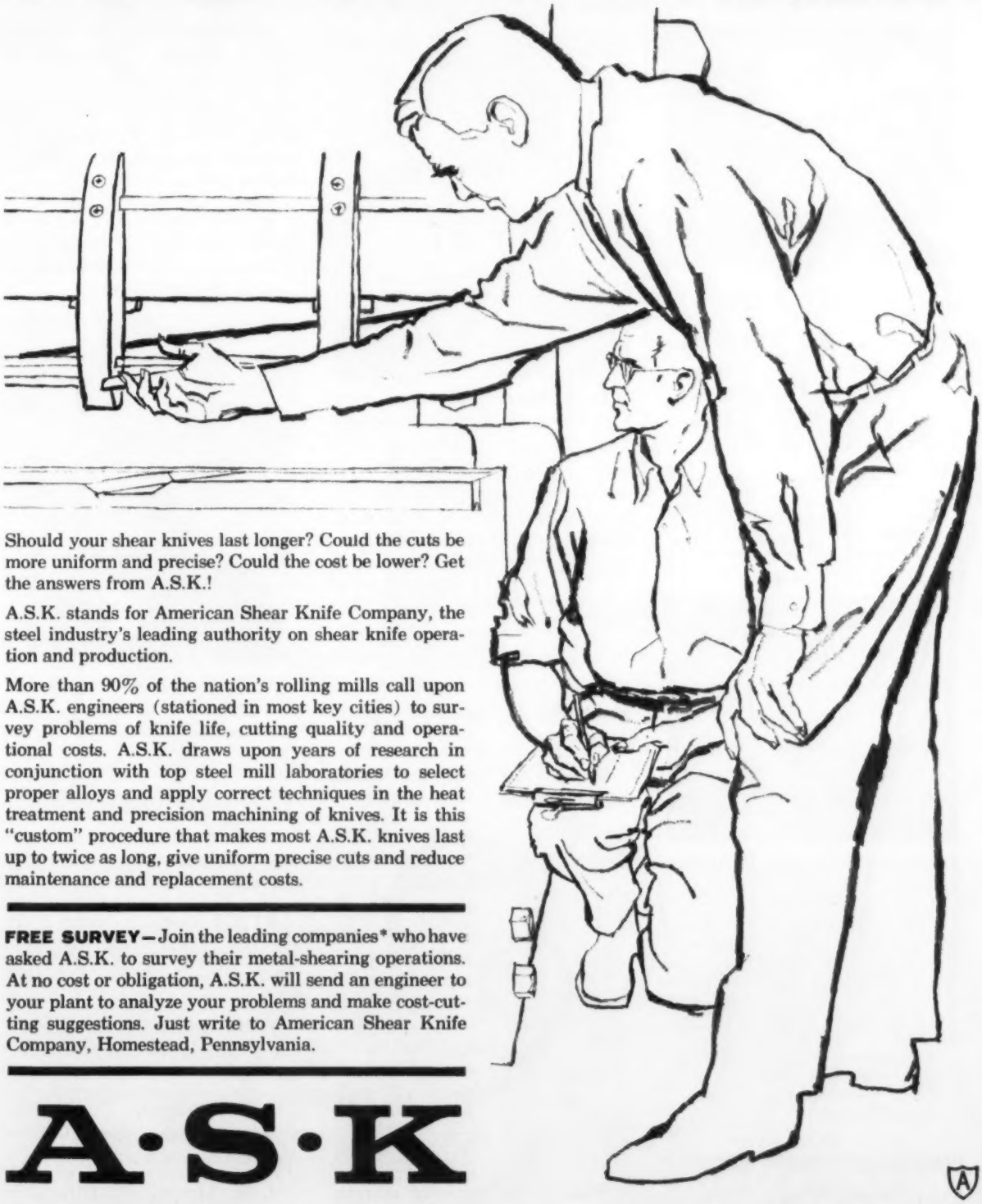
Armco Steel Corp., Armco Div. —**J. M. Leighton,** named supervising purchasing agent, Purchasing

(Continued on P. 90)

M. J. Bair, named asst. to the executive vice president, Pittsburgh Steel Co.

Can you get more wear from your shear knives?

A·S·K for the answer!



Should your shear knives last longer? Could the cuts be more uniform and precise? Could the cost be lower? Get the answers from A.S.K.!

A.S.K. stands for American Shear Knife Company, the steel industry's leading authority on shear knife operation and production.

More than 90% of the nation's rolling mills call upon A.S.K. engineers (stationed in most key cities) to survey problems of knife life, cutting quality and operational costs. A.S.K. draws upon years of research in conjunction with top steel mill laboratories to select proper alloys and apply correct techniques in the heat treatment and precision machining of knives. It is this "custom" procedure that makes most A.S.K. knives last up to twice as long, give uniform precise cuts and reduce maintenance and replacement costs.

FREE SURVEY—Join the leading companies* who have asked A.S.K. to survey their metal-shearing operations. At no cost or obligation, A.S.K. will send an engineer to your plant to analyze your problems and make cost-cutting suggestions. Just write to American Shear Knife Company, Homestead, Pennsylvania.

A·S·K

AMERICAN SHEAR KNIFE

*names supplied on request

Electronic
STAMPING

for **SLABS BLOOMS BILLETS**

with remote control

The newest marking development for stamping heat, cut, and ingot numbers into hot steel. Big, easy to see characters are stamped at the touch of a button. Number changing automatic and away from heat.

View shows 9 rugged stamping wheels with ¾" characters.

All operations remotely controlled. Numbers are set, checked, and stamped from this console.

For full details contact

JAS. H. MATTHEWS & CO.
3962 FORBES AVENUE
PITTSBURGH 13, PA.

(Continued from P. 88)

Dept., Middletown, O.; **W. M. Schuck,** becomes assistant to director, purchases; **W. F. Welch,** named purchasing agent; **A. E. Cockman, Jr.,** named asst. purchasing agent.

J. H. Rooney, appointed manager, sales — ordnance, National Tube Div., U. S. Steel Corp.

American Chain & Cable Co., Inc., Page Steel & Wire Div.—**F. H. Cobb,** appointed district sales manager, Houston, Texas.

Johnston & Funk Metallurgical Corp.—**P. F. Ziegler,** named technical director, Huntsville, Ala.

Union Carbide Olefins Co.—**J. V. Murray, Jr.,** appointed director, research.

Dravo Corp. — **H. R. Mantle,** named assistant to the president.

A. P. Terna, appointed manager aluminum foil sales, Foil Div., Revere Copper & Brass, Inc.

Vickers Inc., Aero Hydraulics Div.—**N. F. Pedersen,** named executive engineer, major programs.

The Baird Machine Co.—**Donald Calkins,** appointed manager, contract services.

The Okonite Co.—**E. C. Brass,** named manager, Cleveland, O., office.

The Babcock & Wilcox Co., Boiler Div.—**R. V. Mourer,** appointed district service engineer, Detroit district.

General Electric Co. — **B. E. Storrs,** appointed service engineer, East-Central district staff, Metallurgical Products Dept.

J. E. Brown, named manager, operations, Chicago district, American Steel & Wire Div., U. S. Steel Corp.

OBITUARIES

R. P. Garrison, president, Garrison Machine Works, Inc., Dayton, O.

R. B. Tucker, 73, former executive vice president and member of the board, Pittsburgh Plate Glass Co.

L. R. Steuer, retired manager, sales, Carbon Bar Div., Bethlehem Steel Co.

R. C. Norton, 79, honorary chairman of the board, Oglebay, Norton Co., Cleveland.

J. B. Tinnon, 74, retired vice president, sales, Metal & Thermit Corp.

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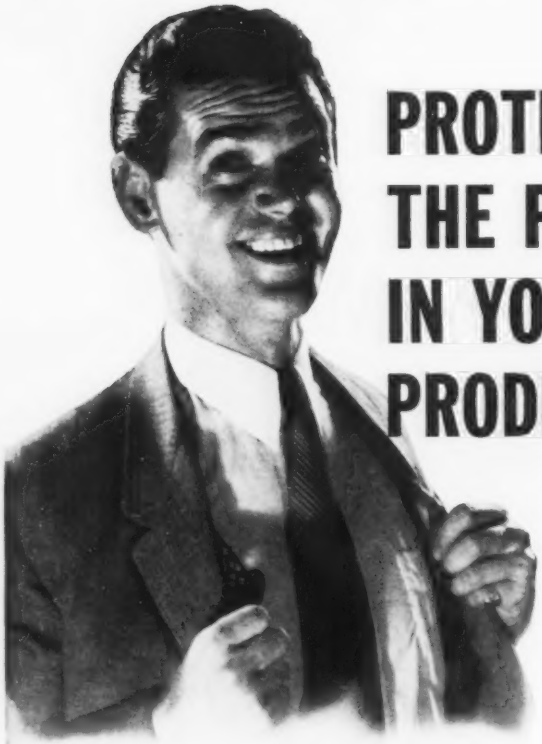
Superior

STAINLESS STRIP STEEL

Powered appliances for the homemaker lend willing help on many tasks—from sharpening knives to broiling chickens. And solid, ever-lustrous Superior Stainless lightens care for the life of each unit: *a wipe, and it's bright!* Superior Stainless Strip Steel is preferred by appliance manufacturers for dimensional accuracy; precisely as-specified composition, temper and finish; uniform ease of fabrication. • Let us have your requirements.

Superior Steel Division

OF



PROTECT THE PRIDE IN YOUR PRODUCT

PRIDE in your product is essential. It builds customer acceptance and loyalty. This means increased sales and profits.

But—it requires constant watching to be strong

One way to make sure it does —is to set up *realistic* quality standards acceptable to you and your customers. The result is the elimination of needless or excessive rejects which can price you out of your markets, lose business, cut profits.

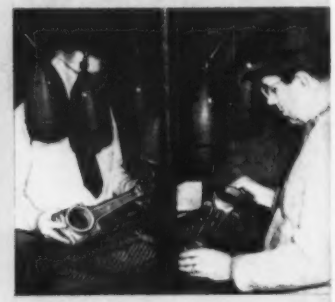
Magnaflux can help you do this through application of a nondestructive testing system designed to meet *your* needs. The testing can cover any design, engineering and production operation including tight specifications, job-lot or high speed processing. It applies to any solid material, metal or nonmetal—even to hardness, conductivity and alloy composition testing.

Established over 30 years ago, Magnaflux Corporation offers more Testing Systems for more test operations than all others combined. When you choose Magnaflux, your judgment is supported by leading engineers, production managers and testing laboratories everywhere.

Our service includes a recognized standard of complete and impartial on-the-job counsel, training courses, and research to meet individual requirements . . . as well as providing you a direct contact with some of the world's finest testing engineers.

Talk to a Magnaflux Engineer . . . the sooner you do the sooner you'll be sure of *protecting* the pride in your product . . . do it *now!*

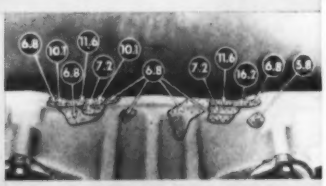
As your "House of Answers" Magnaflux offers you:



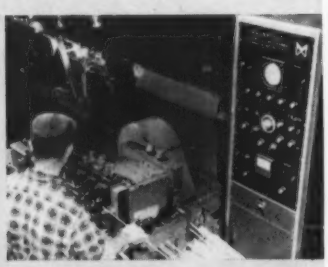
MAGNAFLUX-MAGNAGLO to test magnetic materials for cracks, seams, etc.

ZYGLO for nonmagnetic and other materials (Shown: Complete Portable Kit, $125.00)

SONIZON Ultrasonic Thickness Measuring



STRESSCOAT to find and measure stress on parts.



MAGNATEST electronic testing for hardness, conductivity, alloy, proximity, and many more.

And still other methods and techniques, some completely new.

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The Hallmark of Quality in nondestructive test systems

How To Get More For Your Metalworking Dollar

Maintenance

IN THIS FEATURE

Metalworking plants have one thing in common: They all have production machinery subject to a limited life period.

No one can predict this period with any certainty. But there's one thing that's certain—proper maintenance is the key to getting the most out of a machine.

In fact, the amount spent by industry on maintenance alone is measured in the billions. Clearly, it's an area where there can be major savings.

In planning a maintenance program you can go too far by keeping track of every little component. On the other hand, too little maintenance, or misplaced maintenance, can lead to costly breakdowns.

The answer isn't in the number of maintenance dollars a company spends. It's in the way the money is spent. The major factor is the balance of maintenance cost against the production efficiency of the machine in question.

It calls for planning and coordination between production people and the maintenance department. The payoff is in a workable system that's flexible enough to cope with the varied demands of a production cycle and the emergencies that crop up.

Let Maintenance Take Its Place In the Profit Picture

Too often maintenance receives only passive support from management.

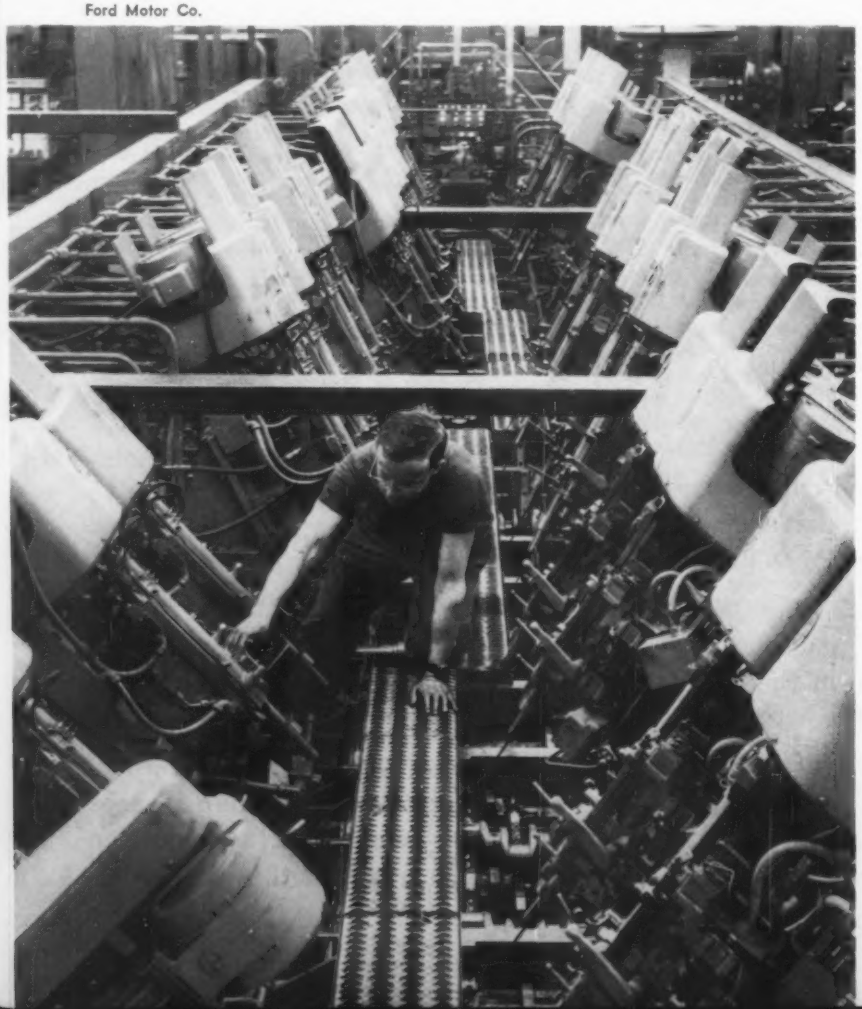
But maintenance takes such a large chunk of manufacturing costs that it pays to put your program on equal footing with other activities.

■ What's the effect on maintenance of today's great expansion in production equipment technology? Do complex mechanisms with precision controls need any special attention?

Try to answer these questions and you wonder whether the traditional approach to maintenance is enough to keep modern metalworking machinery on a profit-making basis.

Stress Basics—While the answer would never be the same for any two plants, you can count on one thing—there's no substitute for planning, scheduling, and keeping of performance records. It's only then that you can make your maintenance dollar go the furthest.

Ford Motor Co.



KEEP IT GOING: There's no room for downtime with this 52-ft transfer-type machine. Even tool changing is part of maintenance.

At the same time, the cost of maintenance is increasing along with the cost of everything else. But the cost of labor, materials, and capital equipment in the production cycle get most of the attention.

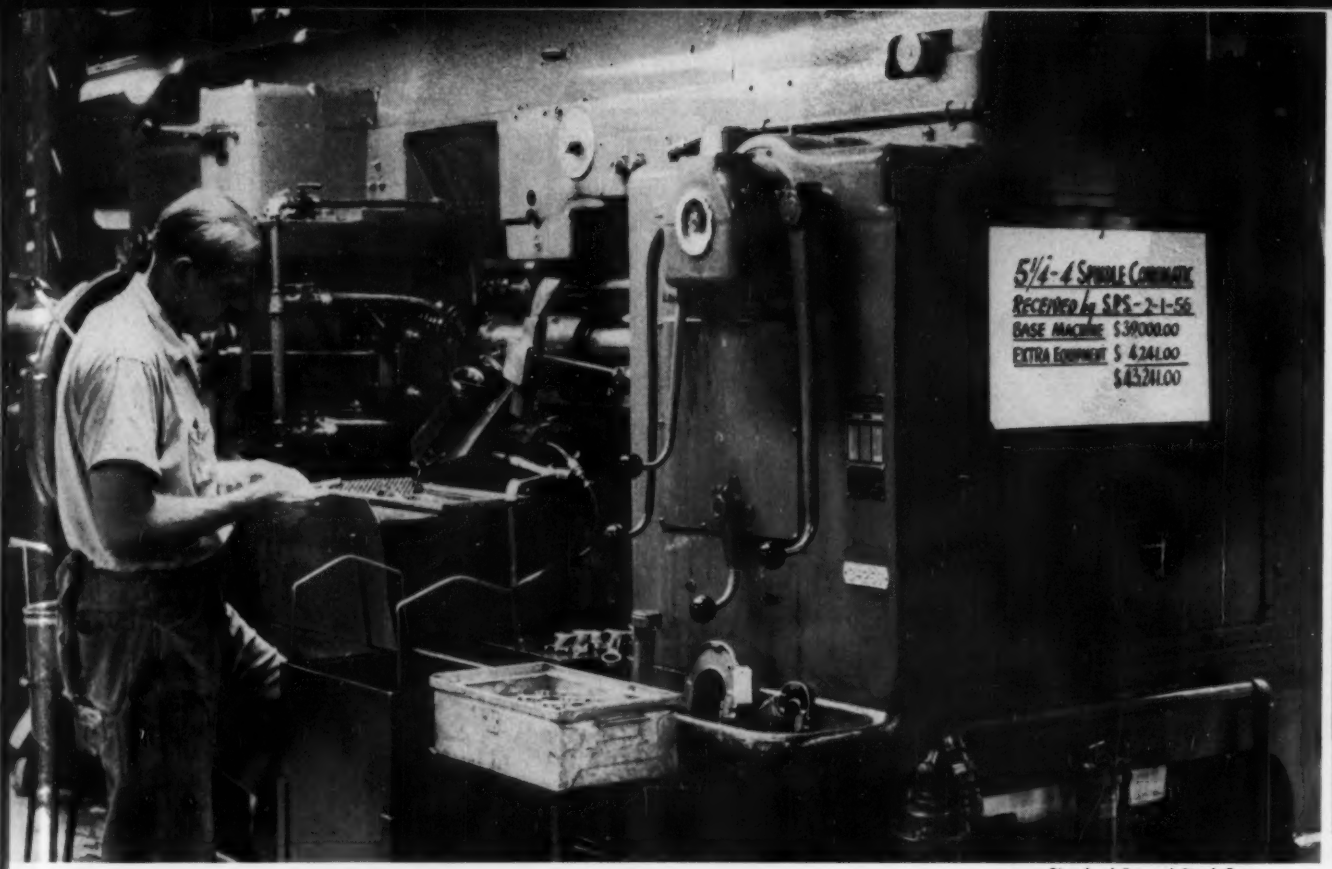
It isn't until you see how large a share maintenance can assume of overall manufacturing costs, that you find that maintenance is a prime area for cost reduction.

Inflation Here Too—The example of nine major steel companies is one case in point. While their total manufacturing costs have doubled in 10 years, the cost of maintenance and repairs has almost tripled.

The total cost of repair and maintenance in 1957 for the nine companies was $1,463,400,000. If only a 10-pct reduction could be effected by improved maintenance, it would add a considerable sum to corporate profits.

The first step in improving maintenance efficiency it to know what your present maintenance program involves and what it costs. With accurate up-to-date data on hand, you can start to tighten maintenance planning, scheduling and execution in those areas where the record shows the biggest opportunity for savings.

Know Your Equipment—Planning starts with the selection of well-designed equipment, and covers installation, upkeep, repair, overhaul and inspection.



Standard Pressed Steel Co.

ATTITUDE COUNTS: Poster with initial cost of tool makes operator aware of the investment in his charge.

It requires written standards for the steps that should be taken for maintaining and inspecting each piece of equipment. Tools for the job and time standards should also be listed.

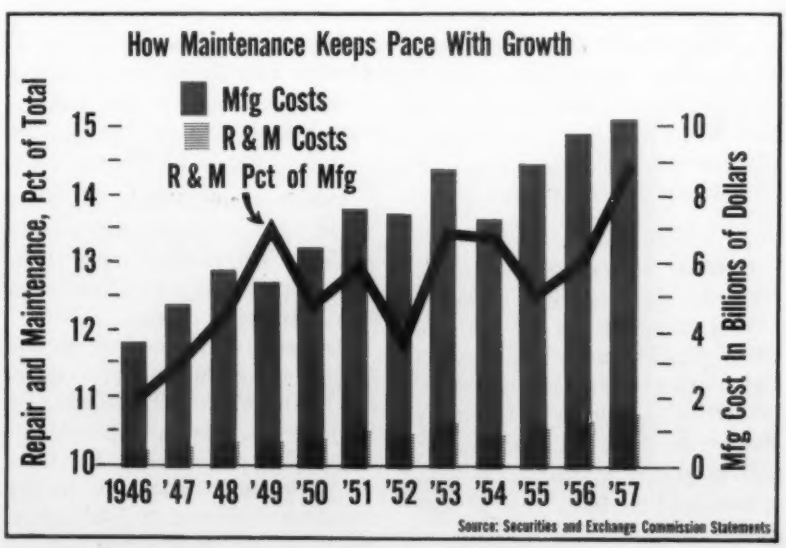
Scheduling is vital to the efficiency level of the maintenance force. Done right, it can minimize over-time work and prevent equipment downtime.

What Production Demands — There must be coordination between the production schedule and the maintenance program. Equipment turning out products with limited life expectancy should not get the same degree of maintenance as machines turning out products that will continue to be produced 10 years hence.

On the other hand, there's risk of obsolescence if a machine's life is prolonged beyond its normal life by preventive maintenance. You may actually be losing out by not having modern and improved equipment. But often it's feasible to constantly improve equipment as it's maintained, adding higher power motors and better tooling.

It's a Philosophy—Maintenance should be considered as an overall philosophy affecting every phase of production operation. As an example, one metalworking plant producing precision fasteners has quite an investment in modern machine tools and production equipment.

Its maintenance practice starts



RISING PERCENTAGE: Repair and maintenance costs of nine major steel companies show faster growth than total manufacturing costs.

Standard Pressed Steel Co.

SCHEDULE DOWNTIME: By scheduling rebuilding of cold header, it's possible to rely on unit to give hard service between rebuilding periods without danger of expensive downtime during peak production.

with selection of reliable machine tools. Machines at the outset must give sustained high production to required standards with minimum attention.

In the case of multiple tools, the company maintains 10 machine tools for every eight operators. That's done on the basis that it costs less to have standby machines than it does to have an operator standing idle or production lost while a machine is retooled or repaired.

Operator Is Key Man — This company also considers operators a vital factor in the maintenance setup. Careful employee selection and training helps keep down the "avoidable" damage. On many machine tools the initial cost of the tool is posted to further impress operators of the investment in their charge.

For companies with small profit margins, it's wise to stress maintenance on critical equipment—machines that will seriously affect production and safety if they break down. Here again scheduling should include periodic checks to make sure that no critical equipment is overlooked.

Another cost cutting tip is to schedule only those jobs that have mandatory deadlines for completion. Remaining work can be kept as a back log to fill slack periods.

Use Standards Wisely — What about time standards and costing methods? This is where many maintenance programs get stalled before they ever get underway.

By measuring the amount of time taken for a given job and comparing it with an established standard for the work, it becomes possible to weigh labor performance. The basis of work measurement is having standards for routine jobs established by time study people.

When maintenance work is studied and standards are established, it's often found that the typical maintenance worker takes about twice as long to do his work as the standard calls for.

But with proper organization and use of standards, maintenance workers can boost their efficiency to 90 pct. Here's a big area of savings worth going after.

Supervision Vital—Another area of cost reduction is proper maintenance supervision. It's much more difficult to supervise maintenance personnel than to supervise direct workers.

For this reason, anything that improves supervision will boost maintenance efficiency. In some plants supervision is spread too thin for effective control.

Time is lost while workmen wait for instructions and decisions. Here is where scheduling and use of standards can bridge the gap between a maintenance job and its efficient execution.

Establish Maintenance Program To Fit Production Demands

As soon as a production unit goes into service, it costs you money to keep it going.

How well you spend your money determines the unit's efficiency during the course of its productive life.

■ Try and get a definition of what maintenance is and it depends on who you talk to. To an accountant it may just be an expense item, 100 pct deductible before taxes. To many production men it's something to put up with at high cost, still with no guarantee that there won't be unexpected shutdowns calling for more maintenance.

Common maintenance as practiced in many plants may consist of frequent lubrication, lots of inspection, sniffing for hot insulation. And there's the hope that when failure does occur, it'll happen when things are slow.

But this approach is entirely inadequate for today's production equipment. To put maintenance in its proper perspective with regard to overall plant operation, it has to be aimed at keeping machines turning out production on a profitable basis.

Prevention Is Byword—First to come to mind is preventive maintenance. Here's where we can define the term as a two-part system of inspection and repair.

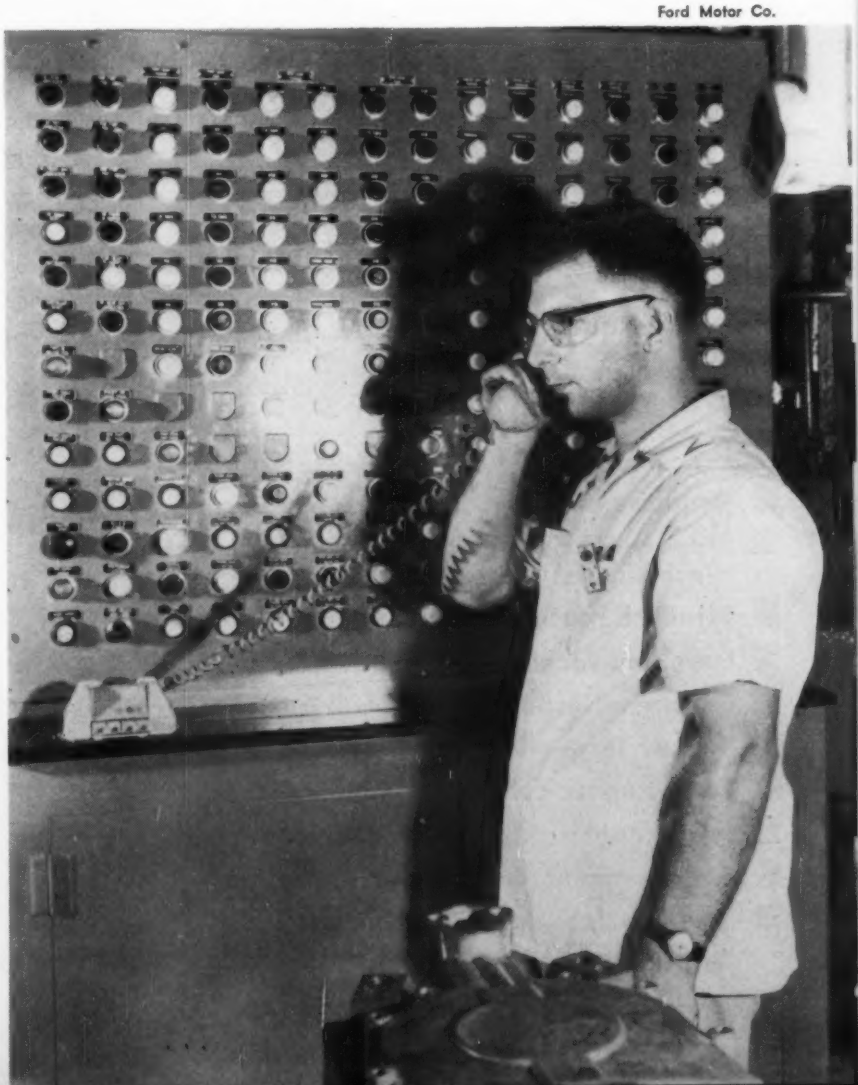
Its objective is to locate and perform needed repairs before these repairs turn up as failures. It's a program of regular inspection to locate and identify needed repairs. It's also a scheduling system to see that these repairs are accomplished.

Setting up an effective program is no small matter. One of the first steps is to determine how much preventive maintenance is called for.

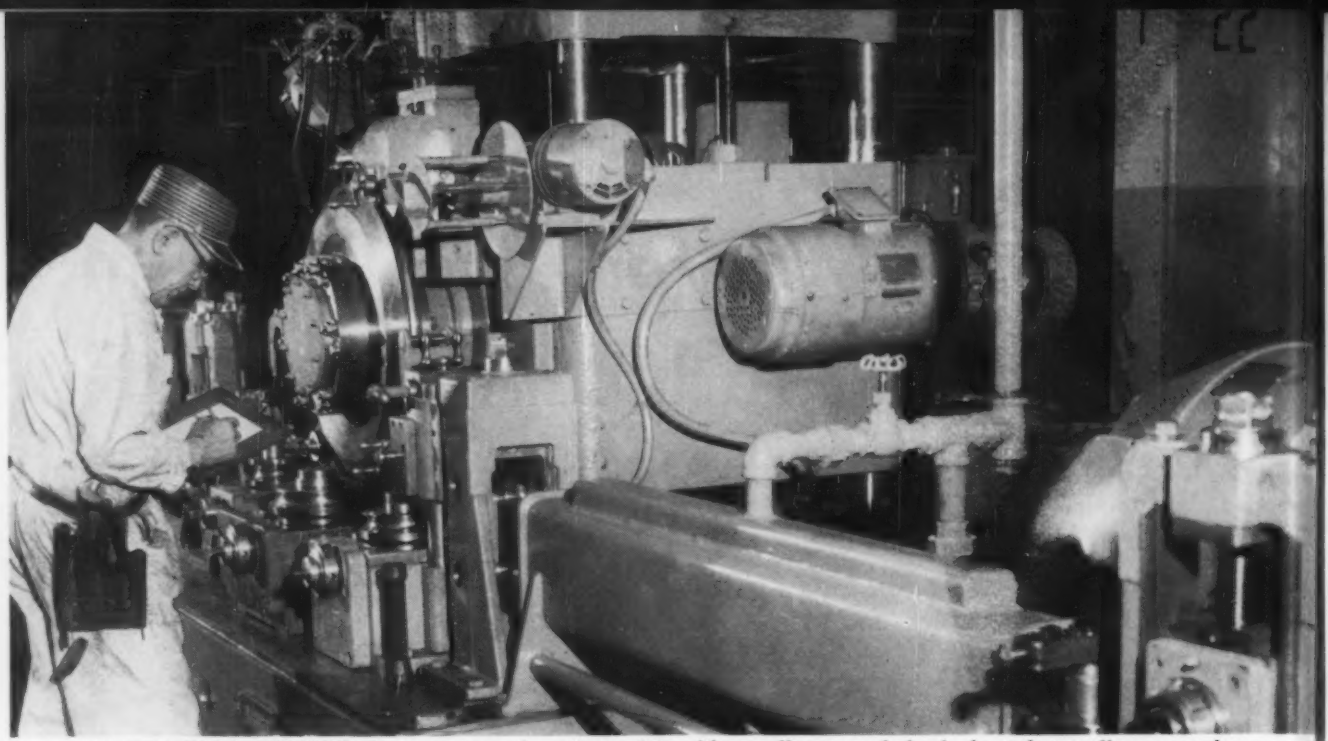
Check Signs of Need—There are several indicators which individually and collectively point up the need for preventive maintenance. If over 30 pct of the maintenance hours are spent in answering trouble calls and repairing minor breakdowns, it's a sign of need.

Repair jobs of the same type will frequently reoccur. Downtime due to machine failures will increase as equipment gradually wears.

Ford Motor Co.



KEYED TO OUTPUT: Operator at control console has direct contact with maintenance men to help speed repairs on 70-ft transfer line.



MAKE VITAL CHECKS: Inspector can do a better job with a well prepared check sheet that outlines procedure.

Any amount of continuous process equipment which does not permit inspection and repair at regular intervals is a must situation for preventive maintenance.

Another good indication is the occurrence of emergency repairs in spurts that make it difficult for the maintenance foreman to schedule the work. There can also be the problem of additional repairs needed on the same equipment soon after emergency repairs have been completed.

Start Can Be Modest—One point to remember is that a preventive maintenance program need not be started on a large scale. In fact, most systems start with a "bite at a time" approach.

Critical equipment is placed on preventive maintenance first. Other areas are brought in as the need is seen and as the maintenance department is ready to handle them.

What is a critical machine? It's one which controls the output of other machines or of an entire production line; one which performs improperly, resulting in high costs; or one which produces sub-standard quality parts resulting in a large number of rejects.

Survey Bares Needs—After spotting critical machines, a survey is in order. A survey results in complete check lists for each machine.

The check lists indicate the desired frequency of inspection and the type of service required to re-

Let Key Man Handle Program

He should qualify with:

- **Shop experience, Organizational ability, Enthusiasm, Perseverance.**

Give him these responsibilities:

- **Organize and conduct equipment surveys**
- **Prepare lubrication and preventive maintenance check sheets**
- **Establish routes and schedules**
- **Issue and receive check sheets**
- **Supervise inspection and lubrication operations**
- **Review inspection reports**
- **Follow up on preventive maintenance**
- **Investigate causes of breakdowns**
- **Analyze maintenance labor utilization**
- **Keep clerical control of program**

pair the machine. One metalworking plant, for example, has a total of 3000 machines. Of these 600 are gear generators of 11 different types.

An initial survey made by production and maintenance superintendents resulted in a list of 134 critical machines. With file folders established for each of these critical machines, a record is kept of all maintenance performed.

Sheets Have Purpose—To determine the desired frequency of inspection and required maintenance and repair, much care must be taken in preparing a check sheet for maintenance and inspection. The effectiveness of the inspector using the check sheet depends on how well it was prepared. Check sheets are not intended to be educational, but are intended to show the scope of work to be performed.

An index of the effectiveness of a preventive maintenance program can be seen in the way in which maintenance requests originate. The company with the plant mentioned above found that as maintenance requests initiated by production were replaced by requests by preventive maintenance people, the total number of requests decreased.

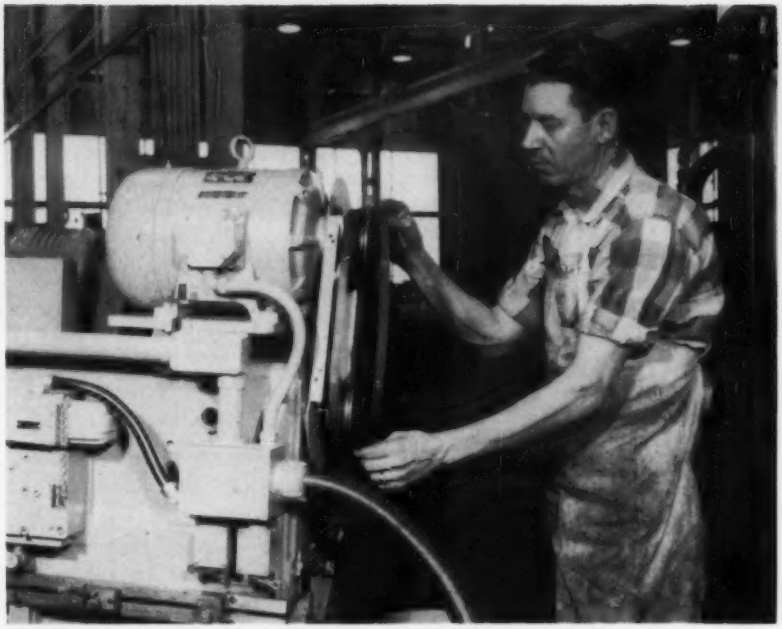
From a number of 250 per day at the beginning of the program, the total number dropped to less than 100 per day at the end of 3 years.

Assign Key Man—Important to any maintenance program is to have coordination responsibilities assigned. The preventive maintenance coordinator is a key figure in keeping administrative control over the program.

In many plants he will work directly under the plant engineer. His duties include organizing and conducting the surveys mentioned above; preparing lubrication and preventive maintenance check sheets; and establishing inspection routes and schedules.

He must supervise and follow up on preventive maintenance operations. He's a key man in trouble-shooting work and investigating causes of breakdowns.

In addition to having organizational ability and shop experience, he must have the enthusiasm and perseverance to carry through with the planned program.



TIMELY PREVENTION: Replacement of belts before they get too worn is common sense. It's the little details that prevent unscheduled downtime.

Cope With Downtime—From a program of preventive maintenance, you can go to the next logical step. While the stress in preventive maintenance is the forestalling of machine failure, the next goal is to keep unscheduled downtime to a minimum.

All the effort spent in preventive maintenance can be lost by one failure. And equipment can still fail

REOCCURRING JOB: Fasteners subject to vibration and shock should be tightened on schedule so as not to interfere with production.

in spite of near-perfect preventive maintenance.

While there are many terms you could call it, one company calls this next step "productive maintenance." It's an engineered program, tailored to a particular plant and designed with the one goal—to keep downtime to a minimum so as to get the most from the investment in plant, tools, and machinery.

Affects Product Cost—It's all the more important as plants take on more complex machines and automation. When high-cost equipment is idle, downtime is reflected immediately in product cost. But such downtime cannot be forecast and here is where the program really pays off.

Just as in a preventive maintenance setup, productive maintenance relies on basic planning and scheduling. Where productive maintenance goes further is in the handling of critical equipment.

Top judgment is required to insure maximum continuity of production. The payoff is in balancing the cost of breakdowns and downtime for each piece of equipment against the cost of stockpiling standbys or parts.

Rely on Spares—Plans for critical spares stock must be put on the budget. Overhauls are projected over the future years to systematically upgrade the condition of equipment.

Using this method eliminates the danger of someday finding an entire line or process that requires immediate overhauling to reduce the danger of an unplanned stoppage. As an example, take the case of a 7000-hp slow speed motor for a slabbing mill. A typical figure for downtime in this case is $80,000 a day.

Supposing a major failure of the armature, with no replacement parts on hand, downtime up to 30 days or more can bring total cost to a prohibitive figure. To make a sound decision, you have to estimate costs using basic sets of conditions. A glance at the accompanying box points up which set of conditions is best.

Clear Choice—It would be better to have spare armature coils stocked than to have none on hand. But in this case having a complete spare armature is the answer, because the additional cost of the part is easily out-balanced by the short downtime and low repair labor cost.

After reviewing each critical machine, a master list can be prepared to guide the purchase of spares and parts for a 5-year period. Engineering and maintenance people can then get together on a purchasing program. It's based on condition of the machine, probability of breakdown, downtime costs in event of breakdown, along with present and future budget considerations.

Makes Planning Easy—Productive maintenance may sound good, but how effective is it? The experience of one plant points up its benefits — average unscheduled downtime dropped 45 pct in the first year. The plant now finds it possible to pinpoint those facilities which cost most to maintain and why.

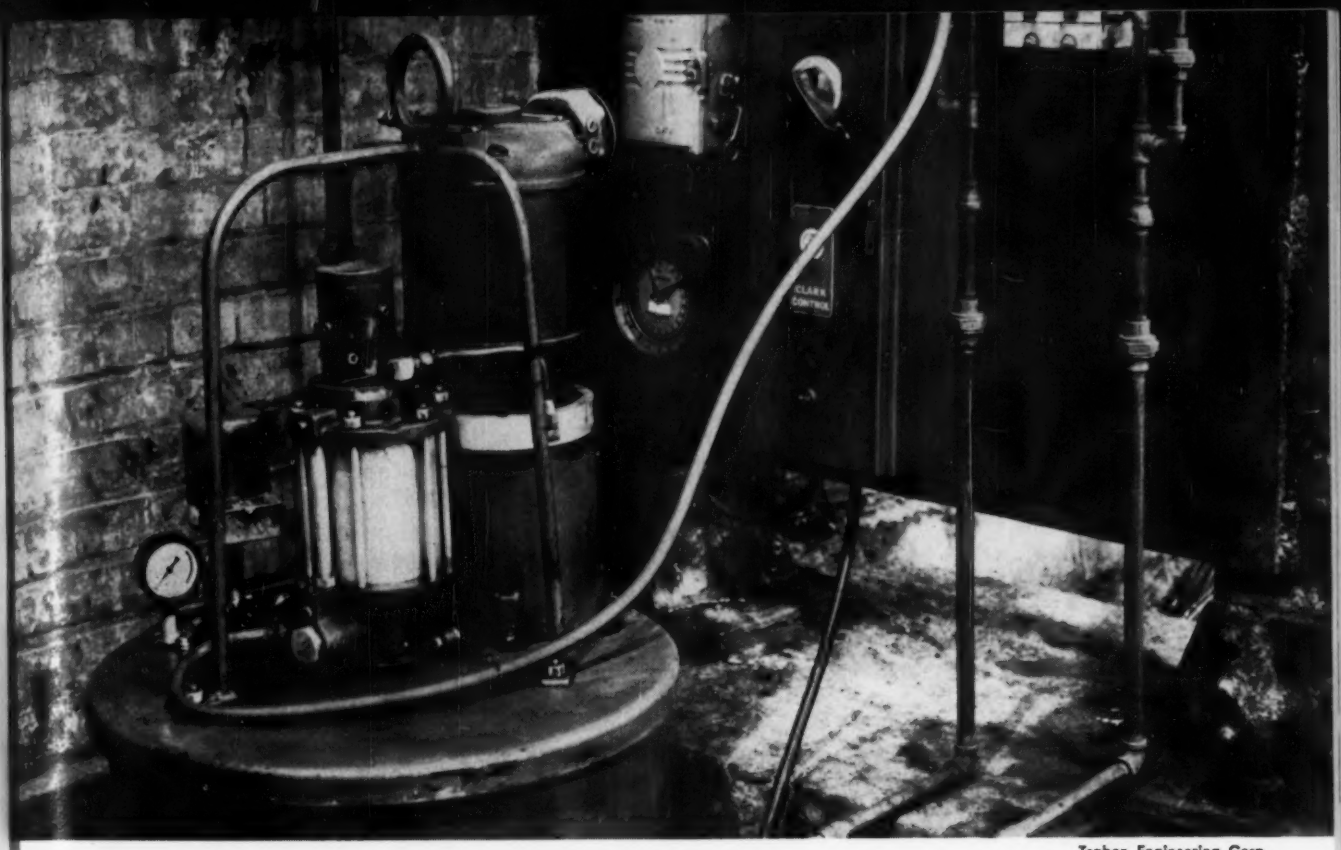
Maintenance crews have a predetermined work load. It's easier to foresee and plan equipment replacement in an orderly manner.

As industry tends towards more and more automation, productive maintenance becomes more and more desirable. It's a program to insure that profits will be returned from the investment in complex facilities that can be so dependent on reliability of individual components.

How Planning Affects Cost

Maintenance Spares Key in Mill Motor Breakdown

Condition A—No parts on hand	
Downtime, 31 days	$ 2,480,000
Cost of repair	104,000
Total cost	$ 2,584,000
Condition B—Armature coils stocked	
Cost of parts	$ 23,600
Downtime, 24 days	1,920,000
Repair labor	78,000
Total costs	$ 2,021,600
Condition C—Complete spare armature stocked	
Cost of parts	$ 267,700
Downtime, 18 hours	60,000
Repair labor	5,400
Total cost	$ 333,100
Condition D—Complete spare equipment	
Cost of spare motor	$ 700,000
Approximate total cost	$ 750,000



Trabon Engineering Corp.

BUILT FOR SERVICE: Centralized lubrication allows pumping lubricant from original container to mechanical parts in remote locations. One system can serve a whole line of tools to simplify maintenance.

You're Coping With Systems

Maintenance Starts With Understanding Their Needs

Whatever system makes your machine tools go—mechanical, electrical, or hydraulic—it pays to keep it operating at top efficiency.

New developments in systems can boost reliability and simplify maintenance.

■ While machine tool builders and component manufacturers have put great effort into simplifying maintenance, it's still up to the user to understand the various operating systems, whether they be mechanical, electrical or hydraulic.

In fact, the more you know about these systems, the further you'll be able to stretch your maintenance dollar. Quite often there's opportunity to specify maintenance aids in ordering new equipment or in repairing old units.

For instance, in planning installations and processes, automatic lubrication can greatly reduce routine maintenance. Use of Joint Industry Conference standards helps get greater accessibility and simplicity in checking out and repairing components.

A War on Wear—As soon as a production unit goes into operation, its mechanical system starts to wear. Lubrication then becomes the principal means of prolonging machine life and productive efficiency.

It has been estimated that for every dollar spent for lubricants, four are spent in applying them. And a hand grease gun or oil can often turns out the most expensive means of application.

As machinery becomes more

complex and precise, there's more need for automatic lubrication devices. Centralized oil or grease systems use piston distributors, valves or injectors, remotely located from a central pump.

Serve Multiple Bearings—These remotely-located units enable the central pump to serve large numbers of bearings through double or single header lines up to 100 ft away from the pump. An outgrowth of the centralized system idea is the circulating-oil distribution system. It has the advantage over the header-type high-volume system in that it divides oil flow accurately and positively.

It eliminates the need for jamming high volumes of oil into a header system. Smaller oil volumes provide equal lubrication.

At the same time, distribution and return line piping is reduced greatly in size—in many cases to one-fourth the capacity. And oil sumps and reservoirs can be squeezed down to 5- and 10-gal sizes instead of 50- to 100-gal capacity.

Combine Machines—The most advanced way to apply lubricants is found in the multi-zone type system. Instead of having a battery of five or ten machines each with its own self-contained pump and lubrication system, a single pump and header serves all machines.

The central pump is usually an "original container" pump which eliminates transferring lubricant. It's one more step towards simpler, safer lubricant practice.

The pump pressurizes a main header which feeds each machine through small tube lines. In each line is a manual valve or electrically-operated solenoid.

Keep After System — One surprising paradox is that the very system which is installed to improve maintenance of equipment is itself often neglected. Some systems can be neglected easier than others.

While sequence-type systems demand continuing maintenance, header types can become more and more inoperative without anyone knowing about it. Regardless of the type of system used, they should be maintained to operate at 100 pct capacity.

The main problem is that there's inadequate training in the service and maintenance of such systems.

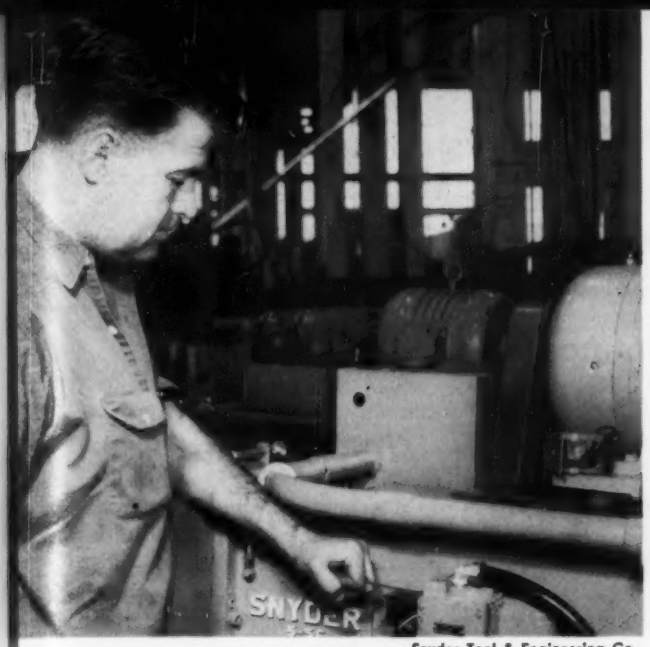
Feed Bearings from One Source

With today's centralized grease and oil systems it's possible to—

- Apply lubricant in complete safety, automatically (or manually) while machine is running.
- Apply lubricant more frequently in smaller, more efficient amounts.
- Apply lubricant positively in measured amounts to fit each bearing requirement. Central warning signals indicate blocked bearings or bearing line, broken main or bearing line, lack of oil supply or pump failure.
- Eliminate hazards of having to hand lubricate hard-to-reach points.
- Make handling of lubricants safer and simpler by the use of central pumping stations where "original container" pumps are used.
- Confine oil and grease handling to limited areas and eliminate oil spillage around production units.

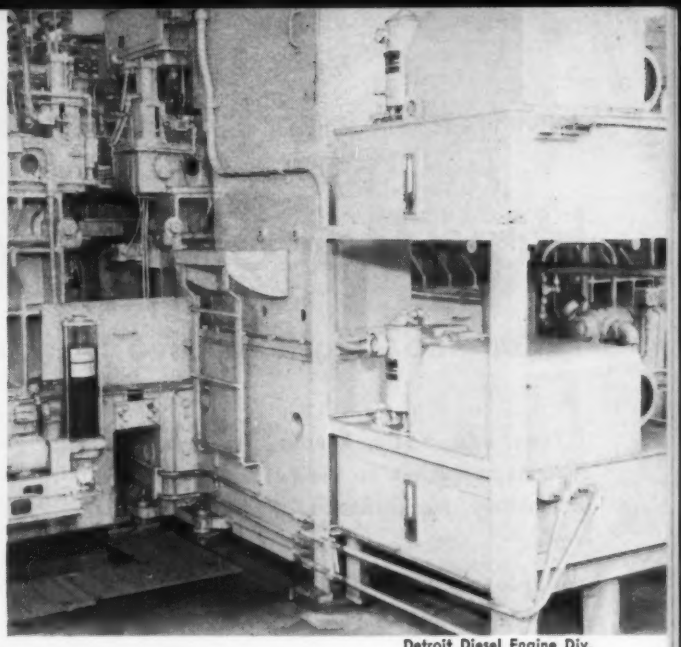
Ford Motor Co.

SIGNALS BREAKDOWNS: Electrical systems take on extra duty, as control panel pinpoints trouble so maintenance men can take quick action.



Snyder Tool & Engineering Co.

WHERE SPARES COUNT: Maintenance worker has easy job of replacing solenoid with spare from stock.



Detroit Diesel Engine Div.

STUDY INSTALLATION: Mounting one hydraulic unit over the other saves space, simplifies servicing.

Minor troubles are allowed to grow into major ones, rather than corrections being made before any serious damage occurs.

Training Is Vital—Likewise, the correction of troubles, whether minor or major, often takes too much time, or the repair itself is not done in the proper manner. The fact is that a trained man can service and maintain a system in a fraction of the time it takes an untrained man.

One solution is to provide for upgrading the type of men employed for this maintenance. Possibly only rewriting of job classifications would be necessary.

In many plants this entire problem can be solved at no extra expense by rewriting job descriptions so that men trained in hydraulic maintenance rather than pipe fitters service lubrication systems.

Electrical Problems—Just as with lubrication systems, electrical controls and drives have come a long way in becoming simpler to maintain and service. But at the same time electrical systems are taking on more and more jobs where reliability is a must.

Component-wise, the trend is towards reducing size of control equipment, even though functions are more complex. This is being done by modulizing equipments.

Where a unit needs replacement, it can easily be removed from the control panel and a spare quickly inserted. Another development is that of providing central points for fault-checking on extensive control panels. Even memory-type fault finders are being provided to pinpoint faults for maintenance men to follow.

Use Basic Checks—While all of these methods are aimed at easing maintenance and reducing downtime, there's still a premium on keeping in check the principle causes of electrical failure: dirt, friction, moisture and vibration.

There's no single test to tell if a motor is good. Tests are just tools to help make a diagnosis, and their limitations must be realized.

Again where the inevitable electrical failure does occur, it pays to have spare parts ready for use. It's best to analyze what will happen if each electrical component on a production line fails.

In many cases the most economical way to get the line back into production is to let things fail and have spares ready for quick replacement. Halting a line to do maintenance work can be more costly than running at full speed until a component fails and being ready for it.

Hydraulic Planning — Maintenance of hydraulic systems begins when a new machine is in the planning stage. Many problems can be forestalled by taking maintenance into account from the beginning.

For instance, hydraulic power units are much simpler to service when pumps and valves are mounted on the outside with a minimum of piping. Manifold panels can even contain entire hydraulic circuits.

Regular and frequent inspection of specified points will help prevent breakdowns. Things like leaks, fluid level and the condition of the hydraulic fluid can be determined by visual inspection.

Keep Up Spares—The life of solenoids and bearings can be calculated with fair accuracy. As with other such critical components, it's essential to maintain an adequate inventory of spares.

Gradual increase in cycle time usually points to excessive pump wear. Plugged suction filters can be spotted by sound.

Fluid temperature above normal warrants investigation. Hydraulic equipment almost always gives warning of trouble before breakdowns actually occur.

How Records Serve Your Program

Tailor Paperwork to Give Maintenance a Lift

Time and again, keeping of records can come to the rescue in solving maintenance problems.

Moreover, it can be the basis for future planning and the key to lower costs.

■ Inseparable from maintenance is the paperwork that goes along with it. While many people regard paperwork as just a necessary evil, it's actually a potent weapon in getting the most benefit from your maintenance dollar.

Properly kept up, maintenance records can be the key to planning your program. You can start with a simple maintenance history card for each production unit.

Plan From Records—Then every maintenance job whether routine or emergency can be recorded. Information posted on the history card includes corrective measures taken, labor hours spent and the cost of materials.

The cards will point up machines subject to repetitive repairs. It's from these records that you can plan ahead for replacement of critical parts or for other maintenance to avert breakdown.

From a simple form for recording entries, you can go to a code system for detailing the causes of repairs. Westinghouse uses such a code with 16 different failure causes listed.

Identify With Code—The code also contains a key with 241 terms for identifying parts of a machine tool. It includes both mechanical and electrical sub-assemblies as well as part names.

Maintenance men carry a plastic-encased card with the entire code printed on it. They can then fill in coded data on their time cards along with a brief description of the repair.

The coded data is transferred to the maintenance history card. It's also listed in a monthly report of maintenance costs.

Tab for Cost Limits—Along with the code, Westinghouse uses a tab system on its maintenance history card. A green tab shows the amount spent on repairs to date and a red tab is placed on the amount indicated for normal maintenance expected per year.

When the green tab overtakes the red tab, it's time to check the record.

Ford Motor Co.

EASY TO ENTER: With convenient card files, maintenance man finds it easy to keep entries up to date.

VISIrecord, Inc

VISUAL FILING: With this filing system, records can be scanned quickly for planning workload.

Here's where the code system comes in handy, because it's simple to spot repetitive repairs.

In setting up a maintenance schedule it's essential to use a survey form that provides the inspector a convenient way to list prospective maintenance checks. After completion of survey, data can be segregated by craft and area to be further listed on maintenance check sheets.

Check Sheet Is Guide — These check sheets should avoid unnecessary details on the assumption that a well-qualified person will perform the work indicated. When the maintenance man finds a condition he cannot correct in the normal course of his inspection, he notes it on the check sheet for action.

To correct such a condition most plants use two different forms—a standard maintenance request form for all items costing less than a specified dollar limit and second, a plant engineering order form.

This latter form provides for more detail than the maintenance request form. It's for items that exceed the dollar limit and require approval by the plant engineer or plant manager.

Have Data Ready — One point that's often neglected is filing of technical data on the tools you have. Operating and maintenance instructions, wiring diagrams, hydraulic circuits and schematic layouts should be kept for ready reference.

Failure to have the right reference can result in serious delays. In the few cases where the manufacturer cannot supply instructions or parts lists, it pays to make them up.

One company has found it worthwhile to photograph all machine parts where the maker did not have adequate material available. These photos prepared as part of a manual have been of considerable value in periodic rebuilding.

Setting up universal maintenance standards with accurate methods-time measurement is vitally dependent on good paperwork. By keeping adequate time records, the maintenance coordinator can apply standards to a majority of jobs.

Standardize Repair Reports

Code Pins Down Part, Reason for Failure, and Action

Part 1—Electrical—Sub-Assemblies

01	Apron	09	Electrical alarm	17	Rectox	24	Switch—limit
02	Battery	10	Furnace—oven	18	Recorder & Controls	25	Transformer
03	Brake	11	Generator	19	Relay	26	Timer
04	Brazer	12	Light fixture	20	Rheostat	27	Tap changer
05	Breaker	13	Magnets	21	Rolls	28	Valve
06	Clutch	14	Meter	22	Starter	29	Welder
07	Controller	15	Motor	23	Switch	30	Others
08	Distributor	16	Push button				

Part 1-A—Electrical—Parts

01	Arc shield	13	Commutator	25	Heater element	37	Shunt
02	Armature	14	Compartment	26	Insulation	38	Solenoid
03	Belts	15	Conduit	27	Insulator	39	Socket
04	Blades	16	Connectors	28	Lamp	40	Spring
05	Brushes	17	Contacts	29	Leads	41	Terminals
06	Brush holder	18	Coils	30	Oil	42	Thermocouple
07	Ballast	19	Electrode	31	Plates	43	Thermostat
08	Battery solution	20	Fan	32	Plunger	44	Tongs
09	Carbon	21	Finger	33	Plug	45	Tube
10	Cell	22	Fittings	34	Resistor	46	Wire or cable
11	Clock motor	23	Fuse	35	Rotor	47	Complete unit
12	Collector	24	Handle	36	Screw	48	Others

Part 2-A—Mechanical—Sub-Assemblies

41	Apron	53	Cross rail	64	Frame	76	Stock feed
42	Arm assembly	54	Cross slide	65	Head	77	Support (outpost)
43	Air control	55	Crank shaft	66	Housing	78	Table
44	Base	56	Cylinder	67	Hoist	79	Tanks
45	Bridge	57	Drive	68	Knee	80	Tail Stock
46	Brake	58	Drum	69	Motor	81	Trolley
47	Bed	59	Electrode	70	Pump	82	Truck
48	Boom	60	Fan	71	Ram	83	Turret
49	Carriage	61	Face plate	72	Regulator	84	Unreelers
50	Clutch	62	Feed box	73	Saddle	85	Others
51	Column	63	Feed mechanism	74	Spindle		
52	Coolant system			75	Steering mechanism		

Part 2-A—Mechanical—Parts

01	Adjusting screw	22	Cups	43	Impeller	64	Rings
02	Arm	23	Crank shaft	44	Lever	65	Rolls
03	Band	24	Diaphragm	45	Line shaft	66	Shaft
04	Beam	25	Disc	46	Lining	67	Sheaves
05	Bearing	26	Dog	47	Link	68	Shifter
06	Belt	27	Drive shaft	48	Mast	69	Slide
07	Blades	28	Filter	49	Nut	70	Sleeve
08	Bracket	29	Finger	50	Nozzle	71	Spring
09	Bucket	30	Fluid	51	Packing	72	Screw—lead—feed
10	Bumper	31	Forks	52	Pedal	73	Strainer
11	Bushing	32	Gage	53	Pins	74	Tires
12	Cable	33	Gasket	54	Pintle	75	Toggle
13	Cam	34	Gear	55	Piping	76	Tubing
14	Cam shaft	35	Gib	56	Piston	77	Valve
15	Chain	36	Guard	57	Plate	78	Ways
16	Chutes	37	Guide	58	Platforms	79	Wheel
17	Clamp	38	Handle	59	Plug	80	Worm
18	Clapper	39	Hook	60	Pulley	81	Complete Unit
19	Coil	40	Hoppers	61	Rack	82	Others
20	Connecting rod	41	Hose	62	Ram		
21	Coupling	42	Horn	63	Retainer		

Part 3—Reason for Repair

01	Dirt—Oil—Moisture	05	Improper setting	09	Misalignment	13	Overload
02	Fatigue	06	Improper use	10	Modify	14	Out of balance
03	Incorrect setup	07	Installation	11	Normal wear	15	Shorted
04	Incorrect lubrication	08	Lack of lubrication	12	Over heating	16	Wrong material

Part 4—Action Taken

1	Repair	2	Replace	3	"E" Order

Look for Worksaving Ideas

Whether it's for a new machine or not, it pays to keep an eye out for ideas to simplify or reduce maintenance.

■ Small details can often make a big difference in the amount of maintenance a machine requires. Often it's not until the unit has been in production for some time that improvements suggest themselves.

Take the problem of fasteners subject to vibration and shock. In one plant, weekend maintenance on 500- and 1000-ton presses was accepted as routine.

A Chronic Problem—The punishment of blanking and piercing runs on boiler plate up to ½-in. thickness caused frequent loosening of bolts. Two men with torque wrenches spent three hours apiece at Saturday time-and-a-half rates going over the presses to cinch down all fasteners.

The weekend tightening didn't always last throughout the workweek, resulting in press downtime as an added expense. The maintenance saver in this case turned out to be use of self-locking fasteners.

These screws make use of a compressible nylon pellet to insure holding power despite shock and vibration. Seated in a small recess near the fastener point, the pellet compresses as the screw is inserted, forcing mating threads together for positive gripping.

Eases Schedule — Installed in place of conventional fasteners securing gib plates to the ways, they have cut the maintenance problem 90 pct on the 1000-ton press. Now the tightening schedule on the screws is once every five months.

To show how a company can specify this type of maintenance-free device on new equipment, one automaker recently ordered a complete set of bumper dies with self-locking screws. It eliminates what was once a constant problem.

There's no longer any danger of a loosened screw smashing a whole die. The self-locking screws are still checked, but nothing like before.

Consider When Buying — The above example shows how you can improve reliability when buying new equipment. Any time spent in specifying maintenance worksavers is well worth the effort.

Centralized lubrication systems have their obvious advantages in being designed into new equipment. What's not often realized is that these worksavers can be mounted just as well on existing equipment to improve performance of your older machines.

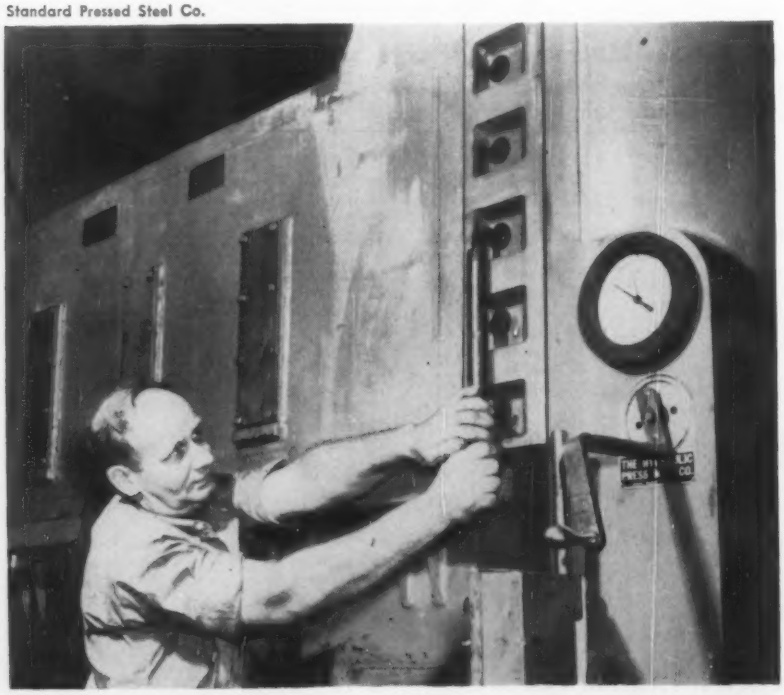
With more and more reliance placed on electric systems, static controls have specific maintenance advantages. While these units have higher initial cost than their conventional counterparts, they soon pay off in ease of servicing.

Simplifies Checkout—It's when electrical and mechanical systems are joined together that static controls show real advantages. Changes can be made by simply adding a block unit and wiring its logic terminals.

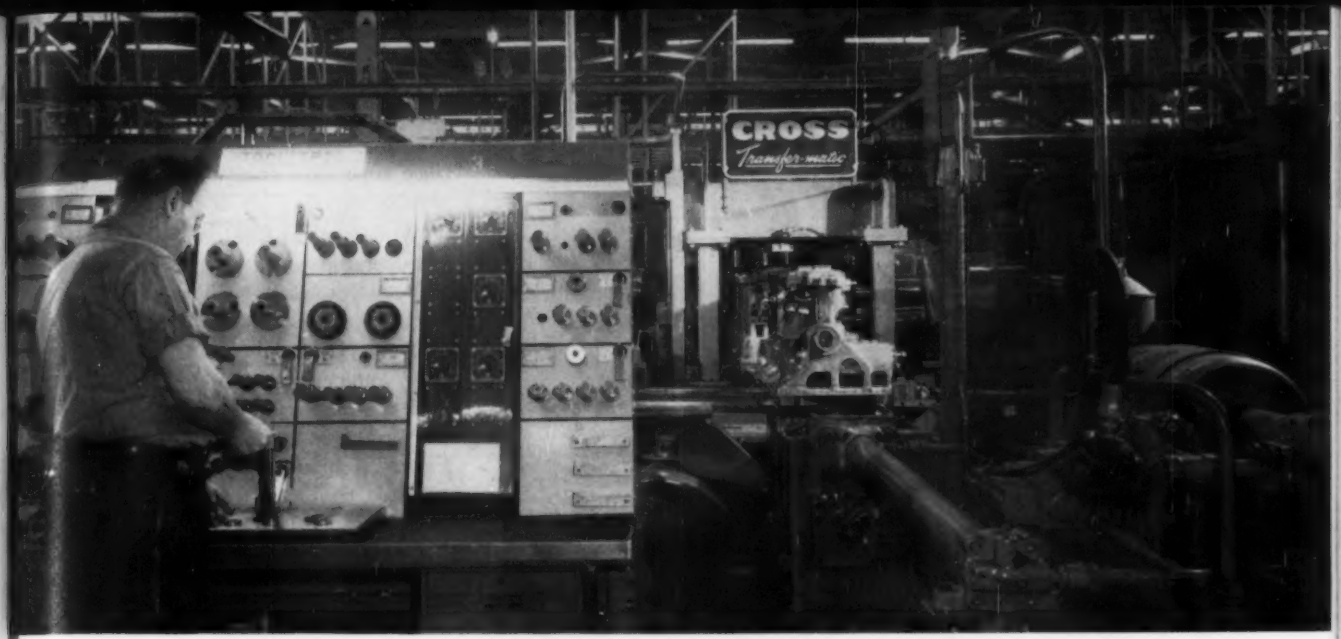
With no moving parts, static controls are less subject to failure. But the main advantage is in the time spent on maintenance.

In one case of two comparative transfer lines, the maintenance time required for the static controlled line was only 4.5 pct of that required for conventional relays.

Standard Pressed Steel Co.



TIGHTEN HOW OFTEN: These self-locking Nylok fasteners stay tight, needing only infrequent checks, instead of weekly tightening.



WHERE TEAMWORK COUNTS: Whether it's merely a tool adjustment or a more hard-to-find control failure, to pays to know what to do the minute trouble starts. Standard procedures can speed action.

Be Ready for Fast Action When Breakdown Occurs

How your trouble-shooting team handles an emergency can well determine whether down-time runs minutes or several days.

It's all the more important with automatic equipment and transfer lines.

■ When machine failure does occur, are you ready to take fast action? Particularly with transfer lines and automated machines, there's no time to waste looking up component locations, tracing lines, or studying unfamiliar diagrams.

Too often a plant handles a new automation line as just another machine. But it only takes a few simple precautions to handle troubles efficiently.

Assign Action—Each member of the trouble-shooting team should be given his area of responsibility. Each should know his part of the job inside and out, whether it be electrical, hydraulic or mechanical.

Another factor is communications. From the minute a report of failure reaches the office of the maintenance coordinator, quick decisions have to be made and orders passed through the organization.

In one plant, a Telautograph system helps speed communications. When a machine requires emergency attention, the production foreman dials the operator in the office of the maintenance coordinator.

Plantwide System—Seven maintenance areas throughout the plant are served by the system. Duplicate machines are located in the offices of the two maintenance superintendents.

On receiving the request for service, the operator transmits to the proper area the date, time, department number, location, type of machine requiring repair, along with the identification number, nature of the trouble, and the craft required to make the repair.

Applying time standards to routine maintenance jobs is a relatively easy job. But it's just as important for emergency trouble-shooting.

Use Flow Chart — One convenient method developed expressly for trouble-shooting work is the flow-chart approach. Each of the steps of the trouble-shooting procedure for various pieces of equipment are put down in logical order.

Some maintenance men perform trouble shooting mainly by instinct, others rely on past experience. As

a result, there's a great variation in procedure.

Even the best maintenance supervisors find it difficult to evaluate mentally all the different courses of action that can be taken in trouble shooting. The flow chart helps resolve this difficulty.

Helps to Train Too—Just as a flow chart helps production people follow the flow of their work, in the same way it helps the maintenance supervisor trace the course of trouble shooting his equipment.

While a good flow chart requires considerable work, once completed it pays for itself both as an aid to setting quick standards and as a training guide for trouble shooters.

In some cases, with complex control equipment, it may be best to set up contract maintenance. One electrical manufacturer provides a service contract that goes way beyond the usual warranty regarding replacement parts on its numerical control systems.

Expert at Hand — Foremost in the contract is the planned assurance that a trained man will be available locally for emergency 1-day service. And there's no limit to such service when controls are at fault.

The contract provides for absorption of charges for two emergency calls where control is not at fault. In addition, to forestall emergency shutdowns, each customer receives four engineering inspection and equipment check-out calls per year.

Although not spelled out in the contract, the customer's maintenance people can get expert individual training through contact with visiting technicians.

Westinghouse Electric Corp.

DIFFERENT PROBLEMS HERE: With static controls, troubles can be traced to individual units. Panel lights spot defective circuits.

Ford Motor Co.

PASSING THE WORD: Efficient communication helps in organizing emergency action. Telautograph system speeds written instructions.

Acknowledgments — The editors are grateful to many companies and individuals for helping make this feature possible. Special thanks go to Detroit Diesel Engine Div., General Motors Corp.; Ford Motor Co.; General Electric Co.; Greenlee Bros. & Co.; H. B. Maynard and Co.; SKF Industries, Inc.; Snyder Tool & Engineering Co.; Standard Pressed Steel Co.; Trabon Engineering Corp.; Trundle Consultants, Inc.; Vickers Inc.; VISIrecord, Inc.; Westinghouse Electric Corp.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Nickel-Coated THOMAS STRIP Cuts Aladdin's Metal Costs 56%

laddin had his fabled magic lamp.

But in real life, Aladdin Manufactur- g Company uses nickel-coated Thomas trip steel to work production magic in s Minneapolis, Minn., plant.

From copper to aluminum to slit steel eets to plain strip and finally—to cold- lled strip steel pre-coated with nickel / Thomas Strip Division of Pittsburgh eel Company.

That's the route followed by Aladdin's errill B. (Ted) Wilcox in his five-year fort to find just the right metal for use his company's line of handsome, useful n-E Hand Warmers.

Thomas Strip Division has grown into laddin's major supplier of nickel-coated rip because:

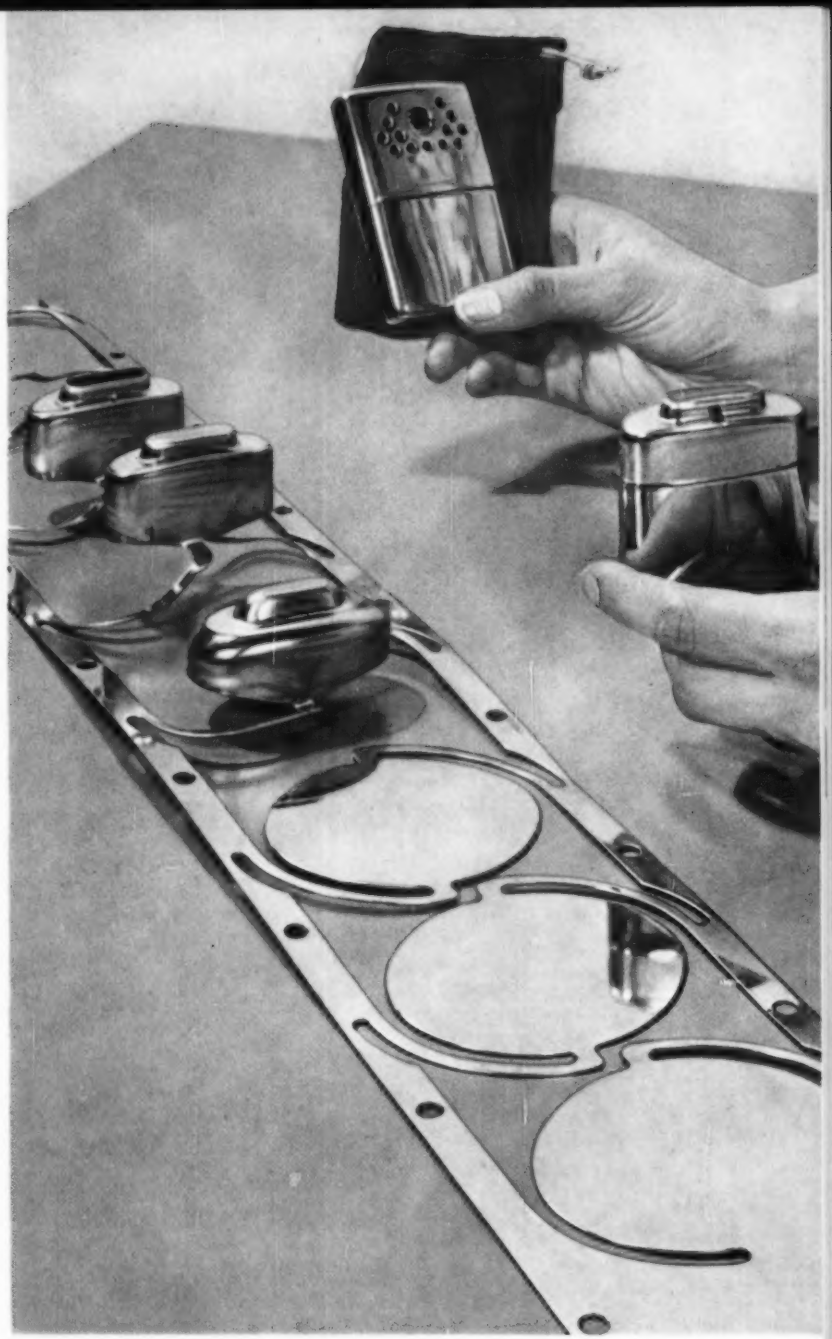
1. **Pre-coated nickel strip cut Aladdin's cost per pound of metal used from 50 cents for plain strip steel to 22 cents.**

2. **Use of nickel-coated strip enabled Aladdin to consolidate four separate production steps—each costing a cent—into a single step.**

3. **Pre-coated nickel cut scrap losses from a high of 20% (with slit sheets) to less than 1%.**

4. **Electrolytic coatings of nickel are more uniform, assuring the necessary snug fit of all Jon-E's components. And the only finishing Aladdin needs on nickel-coated strip is a quick ball-burnishing.**

All the production and design advantages of Thomas Strip are available to you. It is sold plain or electrolytically coated with copper, brass, nickel, chrome or zinc. Thomas also sells a full line of lacquered products. Call the nearest district sales office listed here. Do it today.



SIX-STAGE PROGRESSIVE die forms one Jon-E fuel chamber with every stroke of the press at Aladdin Manufacturing Company. This imposes severe demands on drawability of the 4½-inch nickel-coated steel strip supplied by Thomas Strip Division, Pittsburgh Steel Company. Aladdin credits Thomas Strip with 56% savings in metal costs, as well as sharply reduced scrap loss.

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Pittsburgh Steel Company

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The deck is cleared for action...

In this production-designed Butler building

Up out of the way are heating and ventilating fixtures, lights, bus ducts and cranes. All floor space is reserved for employees, their machines and materials handling equipment. This is a plant geared for production.

This is a Butler building—all 222,000 square feet of it. It belongs to Flick-Reedy Corp., Chicago, whose Miller Fluid Power division manufactures air and hydraulic cylinders. Frank Flick, president, says the working conditions in this building promote employee comfort, safety and convenience. This spells high morale, a key factor in quality production.

Flat roof structures have no such natural accommodation for fixtures, which swoop low overhead, or occupy important floor space. Butler industrial buildings, such as Flick-Reedy's, have the muscle to support heavy cranes and hoists. No need to resort to obtrusive floor cranes, or shore up overhead craneways with bulky, costly reinforcements.

You won't find heavy, expensive interior partitions in Flick-Reedy's production area. Powerful Butler rigid frames support the roof, and span wide, column-free areas. Interior supporting walls are superfluous. This is more than a major economy. It provides a spaciousness that employees like, an openness that means safety, convenience, efficiency.

There's more. Butler offers two new superior curtain wall panels: Butlerib, a handsome, precision formed panel of great strength, and Monopanl, an exclusive factory-insulated panel—both in factory-applied colors. You'll like them. Consult your Butler Builder (in the Yellow Pages), or write direct.

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You Arbitrate It!

CHANGE OF HEART

From the files of
The American Arbitration Association

▪ When a vacancy occurred in the polishing department of an automobile parts plant, the job was posted. After a number of bids were entered it was awarded to the applicant with most seniority. Harold K., second in order of seniority, thought he should have had the job because of his ability. But he didn't make an issue of it.

After the successful bidder was on the job two weeks, however, he quit and went to work for another company. Management thereupon ordered Harold to move up to that spot.

Harold refused. **"I bid for that job two weeks ago and I didn't get it,"** he said. **"Now I don't want it. You can post the job over again and give it to the bidder with top seniority. I won't be among the bidders."**

"We don't have to post that job again," answered the personnel manager. "The contract calls for a 30-day trial period for successful bidders. The polisher quit within that period, so we can assign the job to the man who was next on the list."

Harold was still miffed about the company's action and filed a grievance, which went to arbitration. **How would you rule?**

"You Arbitrate It!" appears in the second issue of The IRON AGE each month. Look for it in the January 14 issue.

The Arbitrator Ruled:

Harold was sustained. The arbitrator said that the 30-day trial period provision **"does not have the effect of qualifying the finality of the initial job posting and bidding."** Consequently, when the successful bidder quit, a new vacancy was created which had to be filled again by the posting and bidding method.

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

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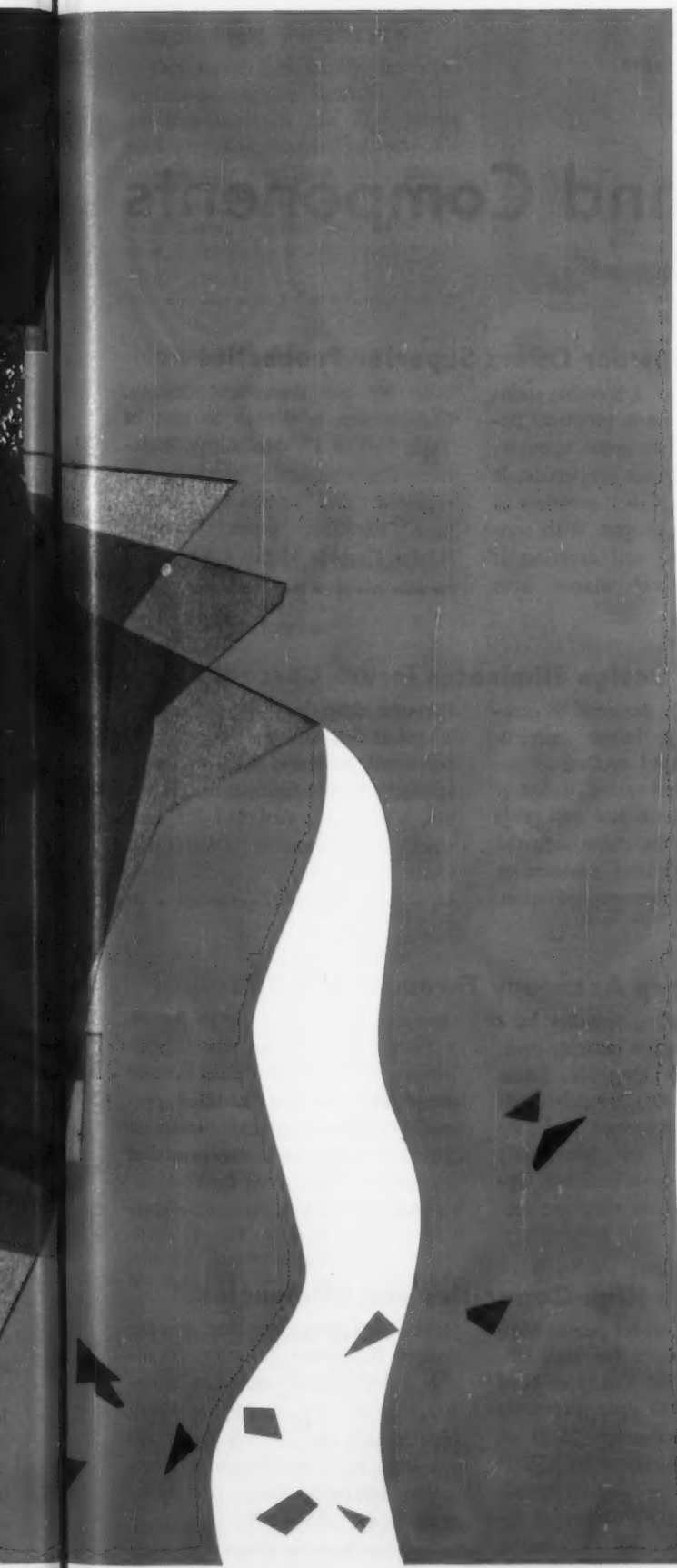

NEW STEEL PRODUCTION RECORDS WITH KAISER BASIC REFRACTORIES!

KEY TO SIDEWALLS: ". . . Periclase Chrome metal cased keys in upper sidewalls of electric furnace gave best performance we've had—15 per cent better than any brick used in the past."

FREE FURNACE BOTTOM: ". . . last furnace rammed with Permanente 165 broke its old production record by some 700 tons of steel—more than enough to pay for the bottom."

GUNNING FOR PROFIT: ". . . consumption of K/R 165 Gunning Grains is down to 4.5 pounds per ton compared to 6 pounds for competitive mix—makes it a paying proposition."

DOUBLE DUTY BACKWALL: ". . . backwall with Kaiser PD Brick looks excellent after 125 heats. Orders are not to shoot it, whereas others go out at 60 heats."

EACH of these statements from Kaiser Refractories customers reports a new performance record or production record made possible by changing to a Kaiser Refractories Product.

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The uniform composition of Kaiser Refractories—your guarantee of dependability—is assured by Kaiser Refractories' fully-integrated facilities. Quality is rigidly controlled from raw material production to assistance in final installation at your mill.

Ask to see the 30-minute color movie, "Progress in Modern Basic Refractories." Arrangements will be made by your Kaiser Refractories Sales Representative.

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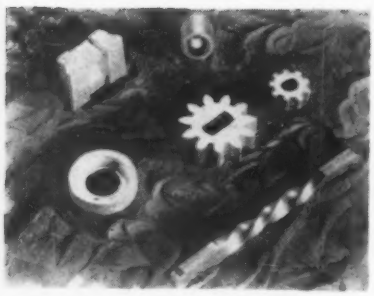
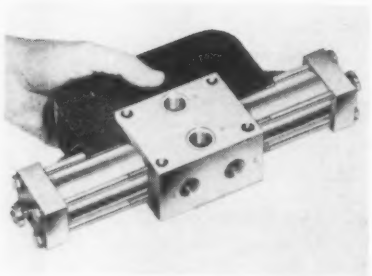


Stainless Powder Offers Superior Properties

At reduced cost, a flowable stainless-steel powder mix produces finished shapes with great strength, ductility, and impact properties. It differs from other such powders in that it is not prealloyed. With conventional pressing and sintering, it produces structural shapes with over 95 pct theoretical density. Composition is similar to that of Type 316 or CF-Mo alloys. Relatively low compacting pressures are required, and compacted shapes have excellent green strength. (Union Carbide Metals Co.)

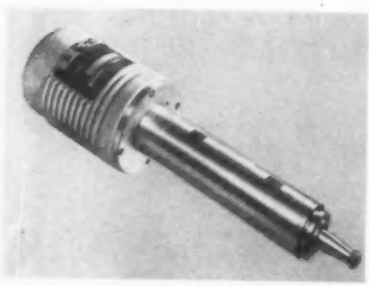
For more data circle No. 33 on postcard, p. 127



New Valve Design Eliminates Inrush Current

New valves are designed to completely eliminate inrush current, permitting as rapid cycling as desired without overheating. Rated at 3000 psi, they have fast and positive action, and the direct-actuated spool requires no back pressure or minimum flow for proper operation. Pressure drop is very low—about 60 psi at 5 gpm. All working parts are totally enclosed and immersed in the hydraulic fluid, insuring long life. Valves are designed for easy stacking or banking. (Waterman Hydraulics Corp.)

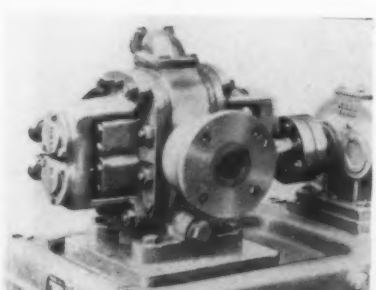
For more data circle No. 34 on postcard, p. 127



Spindles Keep Accuracy Through Long Life

Precision grinding spindles have a large safety margin insuring great accuracy through long life. There are three 3-in.-OD models: belt driven, 1½ hp motorized, and 1 hp motorized. They are heavy-duty type, with double-row bearings. Operating at 3450 rpm, they are recommended for wheels up to 7 x ½ x 1¼ in. or 8 in. for wheels with bonds rated for higher than normal peripheral speeds. Controlled preloading of bearings and runout of 2-tenths maximum insure precision operation. (The DoAll Co.)

For more data circle No. 35 on postcard, p. 127



Pumps Have High Capacities and Efficiencies

Precision gear-wheel pumps have a special tooth form for high efficiency and capacity. Ten types have capacities to 1300 gpm, pressures to 2850 psi, suction to 23 ft of water, and temperatures to 570°F for oil, 200°F for water. Speeds run to 1500 rpm. Flexibility of design includes heating or cooling jacket, and mounting that can be flanged to motors or tanks. Available in all metals, including stainless, they are suitable for use where high suction and delivery heads are required, as in machine-tool lubrication, hydraulic drives, and high-pressure jets. (Milo Mfg. Co.)

For more data circle No. 36 on postcard, p. 127

Insulating Firebrick

Developed specifically for controlled-atmosphere furnaces, an insulating firebrick has high purity and very low content of reducible oxides. In long-time tests, it has withstood the most severe reducing atmospheres without any deterioration. (Harbison-Walker Refractories Co.)

For more data circle No. 37 on postcard, p. 127

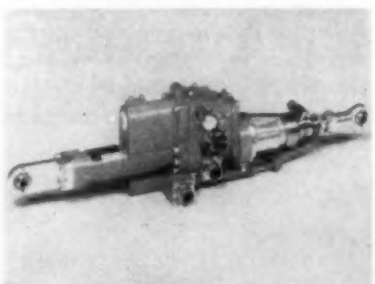
Non-Skid Flooring

A non-skid compound stays down on industrial surfaces for longer-lasting safety underfoot. It is a grit-impregnated bonding resin that can be used on concrete, wood, or metal. (Mine Safety Appliances Co.)

For more data circle No. 38 on postcard, p. 127

Servoactuator

Simple and reliable mechanical feedback replaces electrical circuitry in a new line of electrohydraulic servoactuators. The actuator is positioned proportional to the dc input current, with excellent line-



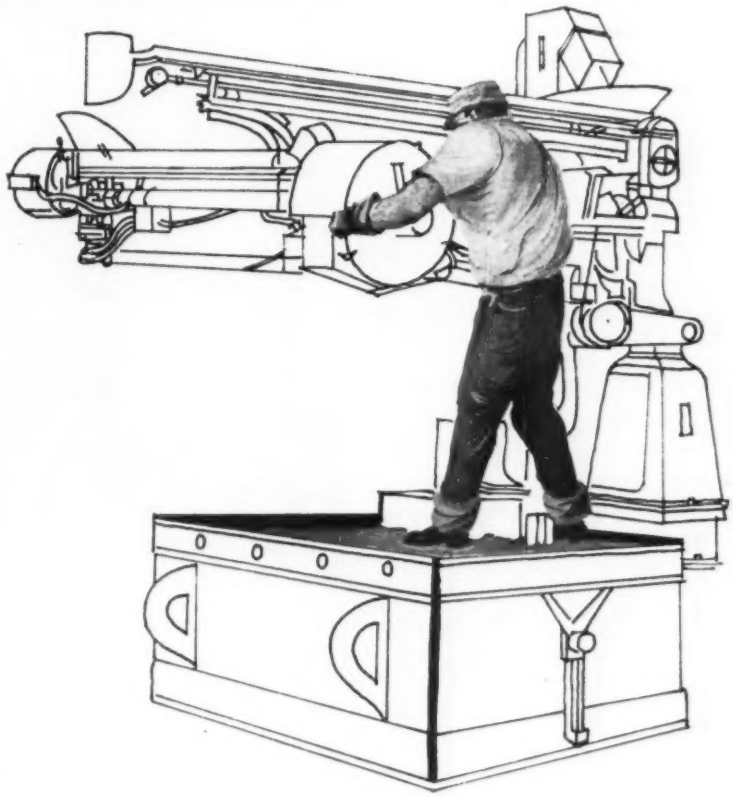
arity and resolution. These servos come with piston areas up to 3 sq in. and strokes to 4 in. They have application in critical control systems where high performance and high power control are needed. (Moog Servocontrols, Inc.)

For more data circle No. 39 on postcard, p. 127

High-Fatigue Nut

Interchangeable with standard nuts, a line of self-locking nuts features a new design that aids in redistribution of the stresses that result in failure. Basis of the design is a relief on the first engaged bolt thread, which is the one that almost always fails first, and a general

men, metal and machines



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equalization of stresses through taper and other means. The result is bolt-nut combinations with up to four times greater fatigue life, optimum load distribution, reduced-height nuts, and weight savings. Although designed for aircraft applications, the new nuts would be useful in many other critical areas. (Elastic Stop Nut Corp. of America)

For more data circle No. 40 on postcard, p. 127

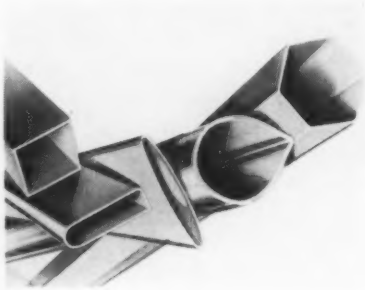
Thin-Section Bearings

A thin-section bearing line includes 90 sizes from 4- to 12-in. bores at prices up to 76 pct below usual custom production prices for similar bearings. They have Conrad deep-groove ball radial construction and a one-piece bronze snap-over separator for improved operation. Sizes range from ¼- to 1-in. width and cross-section. Many sizes have only 34 pct of the width and cross-section and less than 15 pct of the weight of "extra-light" bearings with comparable prices and ID's. (The Kaydon Engineering Corp.)

For more data circle No. 41 on postcard, p. 127

Special-Shape Tubing

Carbon, low-alloy high-strength, and stainless-steel tubing is available in square, rectangular, and a great variety of special shapes over



a broad range of sizes. Shaped tubing is formed from round tube stock. Round dimensions range from ⅝- to 6-in. OD with wall thickness from 0.028 to 0.250 in. Special shapes not stocked can be made to order. (The Standard Tube Co.)

For more data circle No. 42 on postcard, p. 127

Bright-Nickel Process

A new bright-nickel process gives very bright, smooth deposits at high and low current density areas, and levels out scratches to an extraordinary degree. After original makeup, only two addition agents are used. (Hanson-Van Winkle-Munning Co.)

For more data circle No. 43 on postcard, p. 127

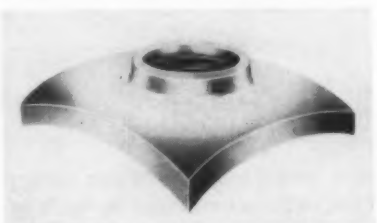
Oil-Quench Guard

Called the "Water Sentinel," an automatic water-monitoring device detects the presence of water in enclosed-type oil quenching tanks used in heat-treating operations. The detector consists of a probe immersed in the oil and sealed in the tank. (Ipsen Industries, Inc.)

For more data circle No. 44 on postcard, p. 127

Self-Locking Nut

Due to its sharp-pointed corners and inherent spring, a one-piece self-locking nut completely eliminates lockwashers and wrenches in



assembly. It comes in sizes #4 through ⅜ in., class 2B threads, in steel, aluminum, silicon bronze, and stainless, plated to specifications. (Jacobson Nut Mfg. Corp.)

For more data circle No. 45 on postcard, p. 127

Gear Drives

Quiet and highly efficient, new gear drives are especially applicable for use in side-entry agitators, and permit use of concentric gear motors in an output speed usually available only in offset shaft construction. Total ratio of concentric-

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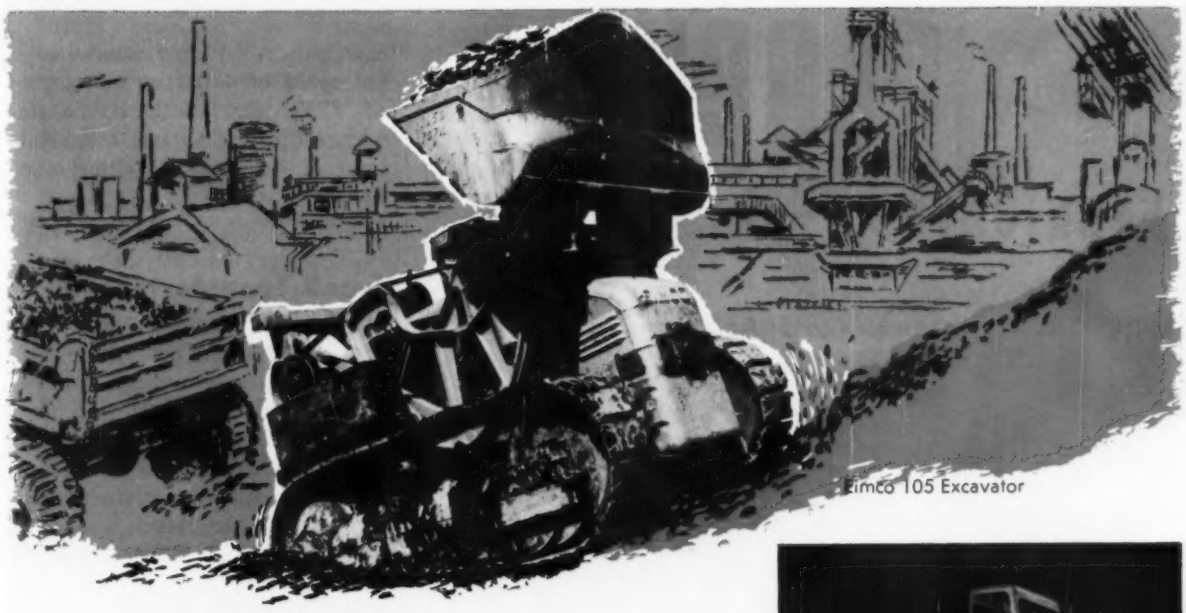

Eimco 105 Excavator

EIMCO LOADERS . . .

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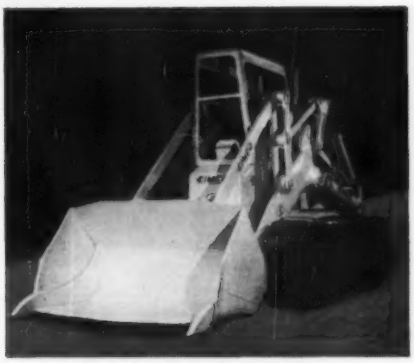

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Rolock has so many successful pit-type furnace equipment installations . . . so many satisfied repeat customers . . . that we feel very confident in promising you equal satisfaction.

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The best way to gain these benefits is to send us your next order.

* **ROLOCK GUSSET DESIGN: An exclusive ROLOCK feature developed out of years of practical experience. Permits properly controlled and supported seal-rim expansion and contraction . . . greatly extends life of retorts.**

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ROLOCK INC., 1362 KINGS HIGHWAY, FAIRFIELD, CONN.

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

3RL59

DESIGN DIGEST

shaft units is 4.17 to 1 with an output speed of 420 rpm with input of 1750 rpm. With right-angle units, output is 280 rpm with total ratio of 6.2 to 1. (Westinghouse Electric Corp.)

For more data circle No. 46 on postcard, p. 127

Small Transformers

Built in single-phase ratings 1 to 10 kva, 600 v and below, dry-type distribution transformers feature quiet operation and small size. The wound-core element is encased in epoxy resin to protect it from dust, moisture, and corrosive fumes. (Wagner Electric Corp.)

For more data circle No. 47 on postcard, p. 127

Stainless Collars

A line of non-corroding precision shaft collars are made of cold-drawn stainless steel, and are designed for use where the corrosion-failure of plain carbon steel is to be avoided. Precision-bored and

ID- and OD-chamfered, they include stainless cup-point socket setscrews. There are 31 bore sizes from ⅛ to 2⅛ in., in 1/16-in. increments. (Climax Metal Products Co.)

For more data circle No. 48 on postcard, p. 127

Cutting Oil

A new heavy-duty coolant and cutting oil has the cooling and load-carrying properties to handle the toughest cutting problems. It provides excellent chip-load distribution, through high chemical activity, and is outstanding in machining improved finishes, on in-

ternal horizontal broaching and rifling operations on soft, tough, or stringy metals. (Shear-Speed Chemical Products)

For more data circle No. 49 on postcard, p. 127

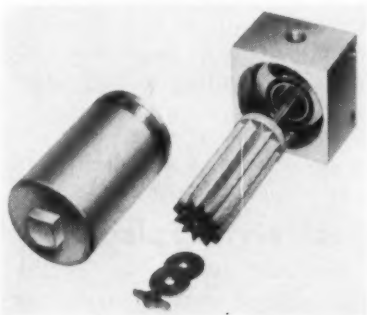
Roll-Positioning Control

An automatic digital control system positions the rolls of a hot strip mill and insures the desired thickness of sheet steel, to an accuracy of 0.001 in. It resets the screwdown rolls in accordance with directions from an automatic gage controller. (Datex Corp.)

For more data circle No. 50 on postcard, p. 127

Hydraulic Filter

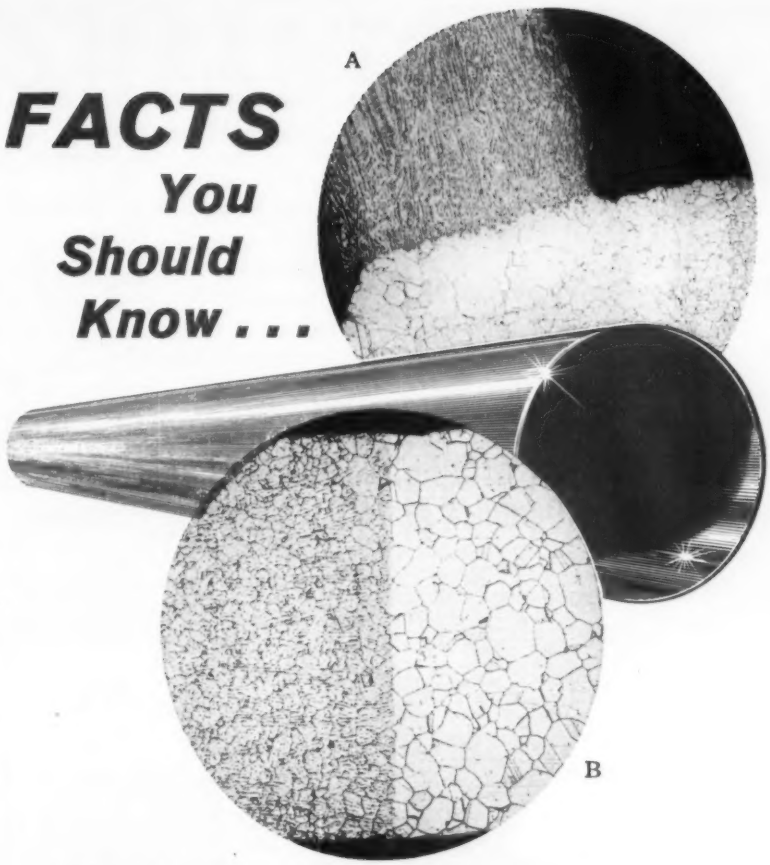
A new hydraulic-fluid filter uses a filter element of reinforced sintered bronze with 40-micron capacity. This rugged component holds up at pressure drops up to 400 psi without damage. At higher pressures it might crack, but downstream components would be protected from particles and small pieces of the element. The entire unit is rated at 1000 psi operating pressure, and comes in ⅜- and ¾-in. connection sizes. It can handle all hydraulic fluids, water, and air. (GPE Controls, Inc.)



For more data circle No. 51 on postcard, p. 127

Silica Glass

A low-cost 96-pct silica glass which withstands heat, thermal shock, and corrosion is available as transparent welding-torch nozzles and protective tubing for thermocouples. In the former case, it is used up to 2400°F, unaffected by oxidation. Its transparency enables the welder to see his work. As a protective shell for thermocouples,



FACTS You Should Know . . . about the DIFFERENCE in Stainless Steel Tubing — —

Both photographs above show the microstructure of the weld and base metal of Type 304 stainless steel tubes. Photograph A reveals accelerated corrosion of the weld metal due to the presence of delta-ferrite. This tube was manufactured by welding, swaging and annealing, which is an insufficient amount of cold work to produce a high quality, uniformly corrosion-resistant welded tube.

Photograph B shows a typical tube supplied by Wallingford Steel. This tube was produced by the welding and cold drawing process, then inspected with a Magne Gauge to insure no ferrite was present in the weld metal. *Processed and inspected in this manner, Wallingford Cold Drawn Tube is guaranteed to show no preferential attack in weld area.*

All Wallingford welded stainless steel tubing is cold drawn and inspected by Magne Gauge. *Can your suppliers say this about the stainless steel tubing they produce?* Wallingford's manufacturing techniques and quality control checks assure top quality — *yet cost you no more.* Why not purchase *your* tubing where *tonnage is produced on a laboratory basis?*

Write for additional information to:
The Wallingford Steel Co., Wallingford, Connecticut.

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Progress in Metals for over 37 Years

WALLINGFORD, CONN., U.S.A.

COLD ROLLED STRIP: Super Metals, Stainless, Alloy
WELDED TUBES AND PIPE: Super Metals, Stainless, Alloy

it withstands short-term temperatures up to 3100°F, and goes directly into the molten metal in electric-arc and open-hearth furnaces. (Corning Glass Works)

For more data circle No. 52 on postcard, p. 127

High-Capacity V-Belts

Using high-strength belts and sheaves, new V-belt drives can handle up to three times the horsepower of conventional V-belt drives occupying the same space. Significant weight savings are also possible, and shaft overhang is reduced. (T. B. Wood's Sons Co.)

For more data circle No. 53 on postcard, p. 127

Waterproof Condulets

A line of condulets for control and indicating stations are sealed with Neoprene O-rings at all critical points, and effectively shut out water traveling with any force, rendering the units explosionproof. They are available in one-, two-, or three-gang pushbutton stations, pilot lights, and selector switches. (Crouse-Hinds Co.)

For more data circle No. 54 on postcard, p. 127

Heat-Resistant Tape

A paper masking tape treated to withstand high temperature has greatly aided one manufacturer of pipe. The ends are wrapped with one layer of this tape before dipping the pipes in tar to guard them against corrosion. The tape is then removed easily and cleanly, leaving a fine smooth surface with no residue. (Behr-Manning Co.)

For more data circle No. 55 on postcard, p. 127

Compound Detergent

A synthetic detergent removes buffing compounds by soak or ultrasonic cleaning from all metals without attack, whether they are high in tallow, or oily, or have combined chemically to form metallic soaps. It is also useful for removal of soldering fluxes and compounds which have impacted. (Conversion Chemical Corp.)

For more data circle No. 56 on postcard, p. 127

Electrolytic Spindles

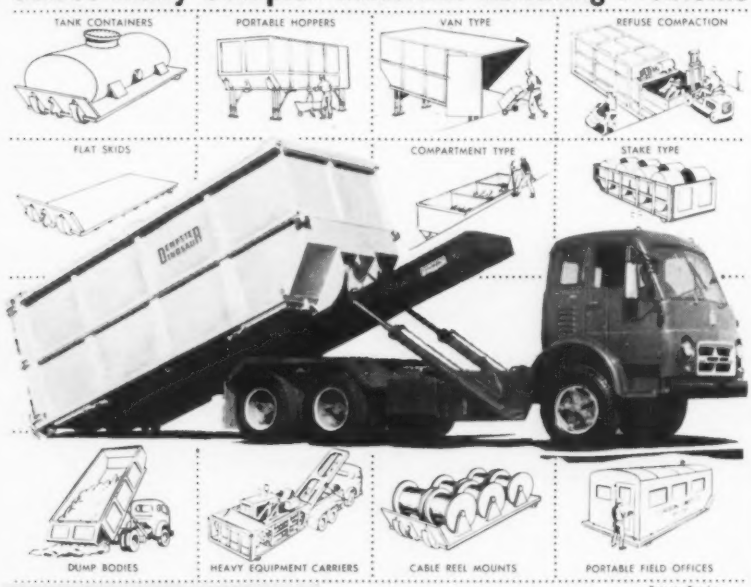
Precision spindles for electrolytic grinding can be motor- or belt-driven. They come for 1 to 20 hp, with speeds of 900, 1200, 1800, or 3600 rpm, rating from 50 to 3000 amp. They have built-in insulation and a rugged fork-type, cool-operating brush assembly for transmitting current to the grinding wheel. (Pope Machinery Corp.)

For more data circle No. 57 on postcard, p. 127

Rust Preventives

Four new rust preventives have been introduced. Two are additives used in wet-blasting abrasive slurry. They leave a film that prevents rust from air or moisture. Two others are compounds for use after cleaning and finishing, and are applicable equally to products of barrel-finishing and wet-blasting. One is an oily-base compound that works under the water, displaces it, and deposits

One DINOSAUR With Detachable Containers . . . . Solves Many Complex Materials Handling Problems



Here's the materials handling tool that takes up where the fork-lift truck leaves off. Gigantic loads can be placed on skids, in tanks or containers. The DEMPSTER-DINOSAUR picks them up . . . automatically . . . in seconds . . . and whisks them to their destination, in-plant or to over-the-road locations. Here they are put down, intact . . . pushed off on a dock . . . left on telescopic legs . . . or dumped.

One truck handles any number of containers of many types. Value of truck is multiplied . . . standing-idle time is eliminated . . . loading and handling is cut to the minimum. One man, the driver, handles the all-hydraulic operations without leaving the cab.

Containers available up to 40 cu. yds. and over . . . loads are limited only by the capacity of the truck. If you have a special problem send it in.

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Inc.
KNOXVILLE 17, TENN., DEPT. IA-12

an oily film. The other is a water-absorbing spray that forms a protective emulsion. The four products are designed to cover a wide range of uses. (Techline Div., Wheelabrator Corp.)

For more data circle No. 58 on postcard, p. 127

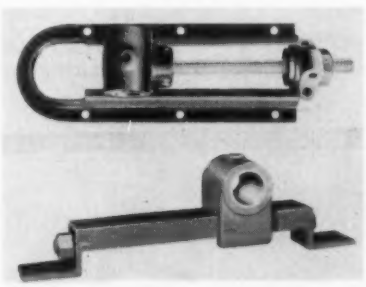
Lag Bolts

A complete selection of lag bolts has been added to a line of standard fasteners. They come in 100 sizes, diam ¼ to ¾ in., lengths up to 12 in. They all have gimlet points and full-size shanks. (Standard Screw Co.)

For more data circle No. 59 on postcard, p. 127

Bearing Takeups

Addition of 74 new sizes, in three new series, brings a line of babbitted and bronze bushed bearing takeups to 10 types and 200 sizes



for commercial shafting up to 5 15/16 in. The new series are designed for use on elevators, chain and belt conveyors, and other special equipment. (Link-Belt Co.)

For more data circle No. 60 on postcard, p. 127

Liquid Cleaner

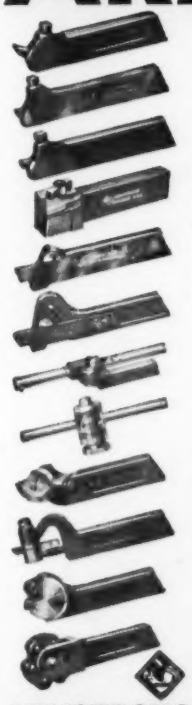
A multi-purpose liquid compound can be used for almost any conceivable industrial cleaning operation. Powerful enough to remove the heaviest soils, it is mild and neutral, and safe on hands and all easily damaged surfaces. (Turco Products, Inc.)

For more data circle No. 61 on postcard, p. 127

Feed-Guide Silencers

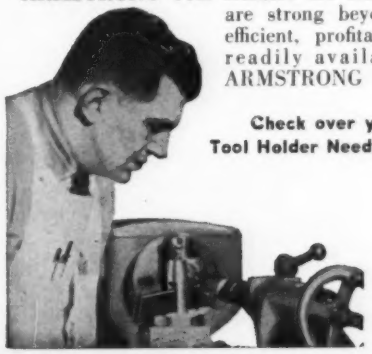
Pipe of polyvinyl chloride or other plastic material used as a liner for the feed guides of automatic screw machines eliminates noise and nicking or scratching of

ARMSTRONG
TOOL HOLDERS
A Correct Tool for Every Lathe Operation



You can save time (and money) by ensuring that your machine tools are equipped with *adequate numbers* of the correct ARMSTRONG Tool Holders. The ARMSTRONG System of Tool Holders includes correctly designed tools for *every* standard operation on lathes, shapers, and planers, and for many operations on turret lathes and screw machines. By utilizing the ARMSTRONG System of Tool Holders, you can reduce tooling costs, eliminate down time in tooling up, operate your machine tools at maximum feeds and speeds.

ARMSTRONG Tool Holders are long-lasting tools. They are strong beyond need, handy and efficient, profitable to use, and are readily available from your local ARMSTRONG distributor.



Check over your ARMSTRONG Tool Holder Needs. Write for literature.

If you do not know the name of your local ARMSTRONG Distributor, inquire when asking for literature.

ARMSTRONG BROS. TOOL CO. 5209 W. ARMSTRONG AVE. CHICAGO 46, ILL.

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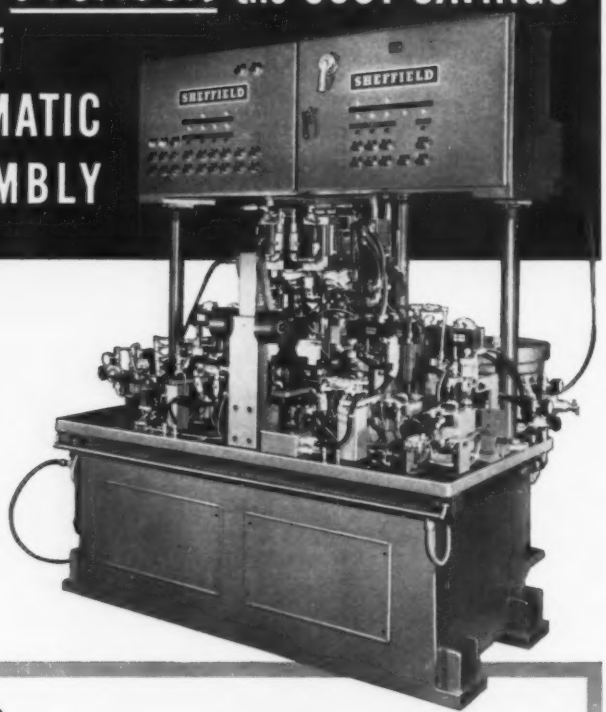

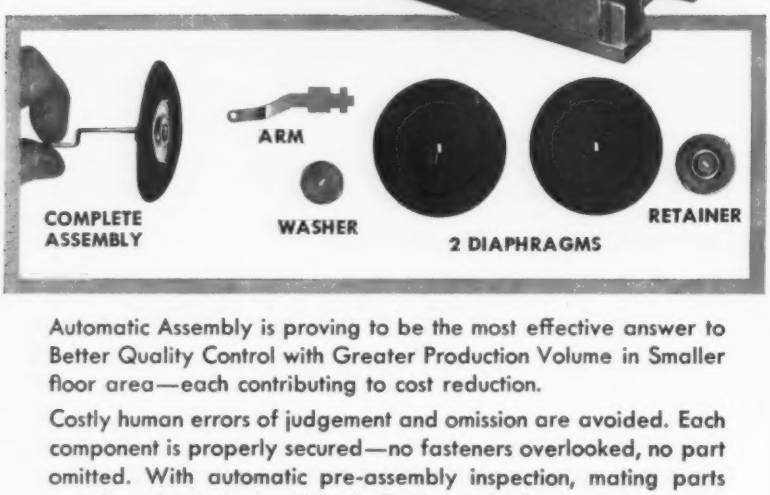

Automatic Assembly is proving to be the most effective answer to Better Quality Control with Greater Production Volume in Smaller floor area—each contributing to cost reduction.

Costly human errors of judgement and omission are avoided. Each component is properly secured—no fasteners overlooked, no part omitted. With automatic pre-assembly inspection, mating parts may be selectively matched for optimum performance.

Far less floor space is required for an assembly machine than that needed for any other assembly method.

A TYPICAL EXAMPLE

This machine which is 4′ x 7′ x 8′ high assembles 5 components of the automobile distributor vacuum contact arm shown at the rate of 900 per hour.

For further information, write to the Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 8.

8412

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manufacture and measurement for mankind

DESIGN DIGEST

the stock. It can be installed at low cost, and in some cases can replace the metal guide completely. (A. M. Byers Co.)

For more data circle No. 62 on postcard, p. 127

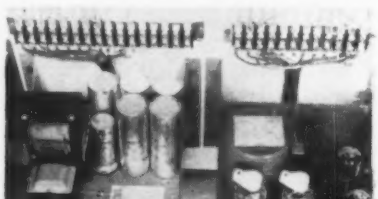
Chain Tighteners

Avaliable in three stock sizes to fit any standard chain, a chain tightener consists of a sprocket adjusted vertically by a worm screw. The device reduces vibration, extends chain life, and provides ample takeup. (Industrial Marketers.)

For more data circle No. 63 on postcard, p. 127

Servo Amplifier

An electronic servo amplifier and power supply will control a wide range of ac servo motors with mechanical power outputs up to 10 w. Sensitive and stable, it will ac-



cept low-level ac signals from a variety of existing transducers and from an ac feedback tachometer. Output power is available at various impedance levels. (Seneca Falls Machine Co., Electronics Div.)

For more data circle No. 64 on postcard, p. 127

Non-Flammable Solvent

A solvent with cleaning properties resembling carbon tetrachloride's, but 20 pct less toxic, is non-flammable and can be used safely in all applications. Recommended for all metal cleaning, it comes in a 5-gal can with metal tray built in, or in 1-gal cans or 55-gal drums. (Speco, Inc.)

For more data circle No. 65 on postcard, p. 127

NEW BOOKS

"Tool Engineering," by S. E. Rusinoff, examines the field as a profession for which men can be trained. It defines the tool engineer's responsibilities, which include planning the processes of production, developing the tools, and integrating the facilities of manufacture, with economy everywhere the keynote. 326 pp. $6.75 per copy. American Technical Society, 848 E. 58th St., Chicago 37.

"Handbook of Practical Electroplating," by T. M. Rodgers, covers in encyclopedic form the theory of plating and the actual practices of plating shops. 333 pp. $8.50 per copy. The Macmillan Co.

"Precision Valley," by W. G. Broehl, Jr., is a detailed and engaging history of the machine-tool companies of Springfield, Vt. These are Jones and Lamson Machine Co., Fellows Gear Shaper Co., and Bryant Chucking Grinder Co. Emphasis is given to the requirements for flexibility in management practices during the changes of a seventy-year period. 274 pp. $7.95 per copy. Prentice-Hall, Inc.

"Metal Cutting Tool Handbook," Revised Edition, presents the latest data on all standard type of cutting tools. For each tool type, design, proper use, and maintenance are covered, followed by tables of dimensions and tolerances. 750 pp. $7.50 per copy. Metal Cutting Tool Institute, 405 Lexington Ave., New York 17.

"Flat Rolled Products: Rolling and Treatment," ed. by T. E. Dancy and E. L. Robinson, is Volume 1 of a series designed by The Metallurgical Society of AIME to cover the entire field of metallurgy. It consists of proceedings of a technical conference held in Chicago on January 21, 1959. 148 pp. $3.75 per copy. Interscience Publishers, Inc., 250 Fifth Ave., New York 1.

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 127.

Snagging Wheels

Features and selection of snagging wheels for swing-frame, floorstand, and portable grinding are covered in a catalog. Also discussed are operation costs, safety practices, and starting grades for rough grinding. (Cincinnati Milling Machine Co.)

For free copy circle No. 1 on postcard, p. 127

Plate Products

A line of plate products includes solid and clad base metals, solid and precious metals, thermostat metals, electrical contacts, and various industrial metals and alloys. It is outlined in a 10-page brochure. (Metals & Controls Div., Texas Instruments Inc.)

For free copy circle No. 2 on postcard, p. 127

Grinding Information

Grinding troubles aren't always the fault of the wheel. Sometimes it's machine imbalance and vibration that cause rejects. Vol. 2, No. 2 of "Cutting Trends" tells what to do about it. (Simonds Worden White Co.)

For free copy circle No. 3 on postcard, p. 127

Tape Tension Gage

A product bulletin describes a tape tension gage for magnetic tape recorders/reproducers. It permits accurate tension measurement and adjustment to be made quickly and easily. (Consolidated Electrodynamics Corp.)

For free copy circle No. 4 on postcard, p. 127

Coolant Pumps

A 16-page catalog illustrates and describes a line of coolant pumps for machine tools. Varied mounting and operational arrangements are possible. (The Ruthman Machinery Co.)

For free copy circle No. 5 on postcard, p. 127

Straightener/Bender

A bulletin illustrates and describes the use of a lightweight straightener and bender for straightening or curving a wide variety of parts and fabricated sections. (Architectural Iron, Inc.)

For free copy circle No. 6 on postcard, p. 127

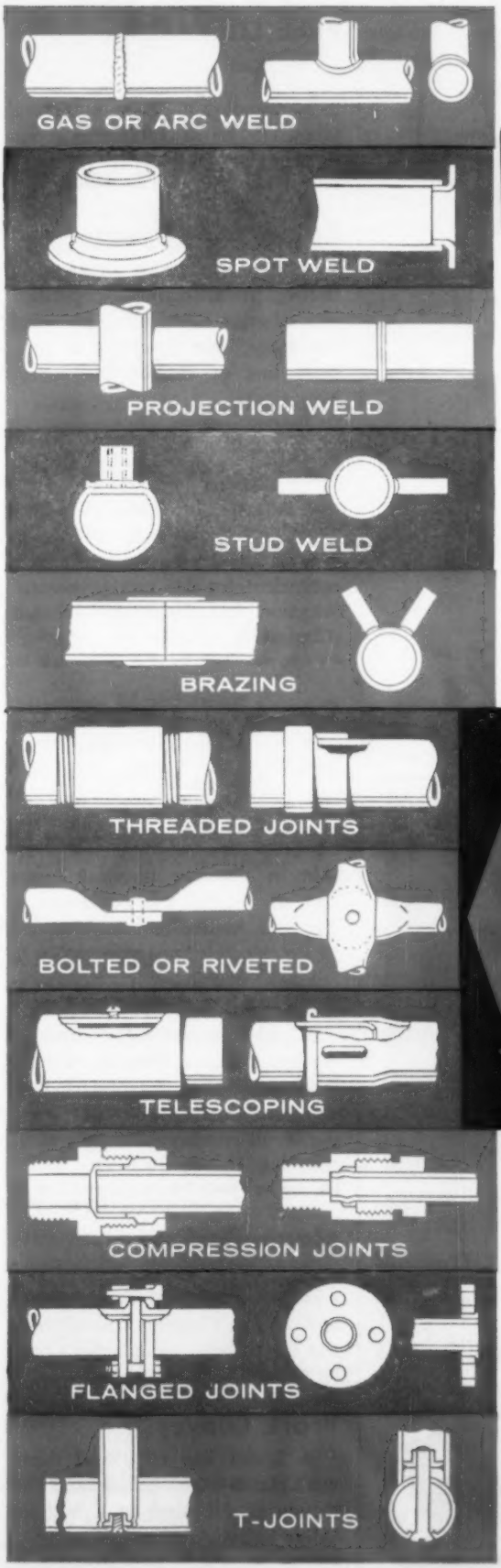
Busway Systems

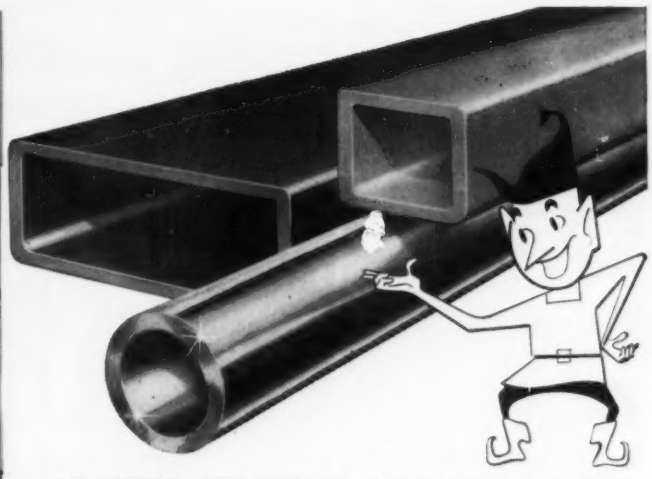
An illustrated bulletin shows the use of a line of trolley busway electrification systems in varied crane and hoist installations. Service ratings are shown for all systems applicable to cranes and hoists. (Feedrail Corp.)

For free copy circle No. 7 on postcard, p. 127

Speed Adjuster

A two-page catalog includes all data and specifications of a variable-speed transmission with 3:1 and 9:1 ratios and basically constant horsepower. It is designed around a special timing belt and a variable-pitch pulley. Torque rating is 52





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For easy "fit-up" and versatility there is nothing that can beat Welded Steel Tubing from a quality tube producer. This time specify Welded Steel Tubing.

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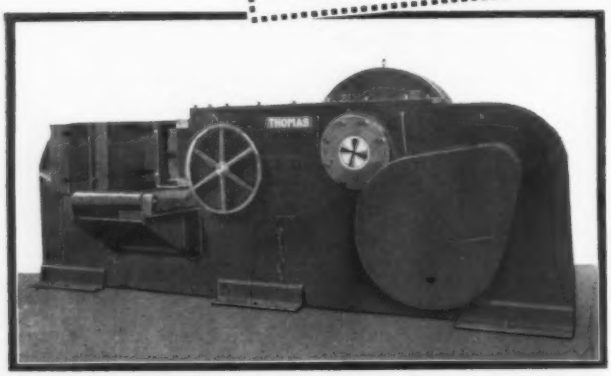
LC-594

The trend is to Thomas

FOR *Cold* BENDING AND STRAIGHTENING

Bars, Billets, Structurals, Rails, etc.



Write for Bulletin 315

The Thomas all-steel Bending and Straightening Machine is built in six sizes, varying from 50 to 400 tons. It does the job quickly and efficiently either *before* or *after* fabricating.

• *Rams are quickly and easily adjustable by means of convenient handwheel so located that operator has unobstructed view of work.*

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64

He's lifting 5 tons with 1 finger

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Here's 1 man—a C-F Lifter and an electric hoist handling 5 ton packs of sheet steel with speed, safety and economy. One C-F Lifter handles a wide range of sizes . . . adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes in a few seconds. Made in capacities from 2 to 60 tons.

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FREE LITERATURE

lb-in. input, 156 lb-in. output. It takes 1½ hp at 1800 rpm input. (Western Transmissions)
For free copy circle No. 8 on postcard, p. 127

Spiral Conveyors

A 56-page catalog offers engineering data, layouts, capacities, and selection information for spiral conveyors, and describes a complete line of them. (The Jeffrey Mfg. Co.)
For free copy circle No. 9 on postcard, p. 127

Heat-Treat Control

"Temperature Control of Heat Treating Furnaces" is a 24-page bulletin describing systems and equipment for this type of control. Selection information is included. (General Electric Co.)
For free copy circle No. 10 on postcard, p. 127

Copolymers

A comprehensive bulletin describes a line of various copolymers and their applications. Exhibiting distinctive adhesive and film-forming properties, they are now available in different physical forms, and in various compositions. (General Aniline & Film Corp.)
For free copy circle No. 11 on postcard, p. 127

Welding Equipment

A 20-page catalog covers the Heliarc line of manual welding equipment. The equipment described is suitable for manual welding of all commercial metals to ½ in. thick. (Linde Co.)
For free copy circle No. 12 on postcard, p. 127

Magnafluxing

A booklet briefly describes the wide range of reliability tests now available in Magnaflux nondestructive test systems. (Magnaflux Corp.)
For free copy circle No. 13 on postcard, p. 127

Work Gloves

A broad line of coated fabric work gloves for industrial hand protection is described in a bulletin. (Mine Safety Appliances Co.)
For free copy circle No. 14 on postcard, p. 127

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Bearing Balls

A price list gives specifications and stock sizes of a line of HSS (M-10, vacuum-melted) balls for bearings and other components operating at up to 900°F. They are made to tolerances of plus-minus ten millionths on both size and sperhericity, with 2-microin. finish. (Industrial Tectonics, Inc.)

For free copy circle No. 15 on postcard

Haulage Machines

Fourteen typical layouts, illustrating the many types of uses to which car spotters and car pullers can be adapted, are illustrated in a booklet. (Link-Belt Co.)

For free copy circle No. 16 on postcard

Bed-Gap Lathe

A bulletin describes a new heavy-duty extension bed gap lathe which swings 26 in. over the bed, 46 through the gap. Center distance is 48 in. closed, 84 open. There are 18 speeds, 60 feeds, and 60 thread changes. (Nebel Machine Tool Co.)

For free copy circle No. 17 on postcard

Aircraft Steels

Mostly used in aircraft and missile production, steels AM-350 and AM-355 can be used in other critical applications. They are described in a 24-page booklet, which includes full working information. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 18 on postcard

Heat-Treat Furnaces

Power convection is used in a line of heat-treating furnaces described in an eight-page folder. High rates of heat transfer result. (Surface Combustion Corp.)

For free copy circle No. 19 on postcard

Drill Unit

A six-page circular describes a "building block" air-hydraulic drill unit for use in automatic drilling and tapping machines. It features unusual versatility and adaptability, with quick, positive adjustment of all motions. (The Hartford Special Machinery Co.)

For free copy circle No. 20 on postcard

Hardfacing Gun

A bulletin describes a plasma flame spray gun for applying coatings of any material which can be melted without decomposing. Despite melting temperatures from 10,- to 15,000°F, sprayed work stays cool. High-density coatings are produced which are strongly bonded to the work surface. (Metallizing Engineering Co., Inc.)

For free copy circle No. 21 on postcard

Slim Bearings

A folder specifices a complete line of slim radial ball bearings comprising 90 sizes with from ¼- to 1-in. width and cross-section and 4- to 12-in. bore. Many have only 34 pct of the width and cross-section and less than 15 pct of the weight of comparable "extra-light" bearings. (The Kaydon Engineering Corp.)

For free copy circle No. 22 on postcard

Air-Pollution Filters

A bulletin describes a line of glass-fabric filter tubes for control of air pollutants. (Coast Mfg. & Supply Co.)

For free copy circle No. 23 on postcard

New Thread Form

A four-page folder describes a recently developed controlled screw thread-root form which features a larger and more uniform root radius of concave configuration. Fatigue life is shown to be up to 100 pct greater than that of screws with

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FREE LITERATURE

conventional flat thread roots. Tensile strengths rate as high as 195,000 psi, minimum. These screws fit any standard nut or tapped hole. (Standard Pressed Steel Co.)

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Chemical Cleaners

A technical bulletin presents full information on the use of a line of various chemicals for cleaning metals and various industrial apparatus and installations. Selection information is included. (Chas. Pfizer & Co., Inc.)

For free copy circle No. 25 on postcard

Hydraulic Cylinders

Selection and specification from a new line of interchangeable high-pressure hydraulic cylinders are made easy with a catalog featuring a handy fold-out arrangement of mounting diagrams with dimension charts, ordering information, and a parts list. The cylinders come in 12 bore sizes from 1⅛ through 12 in., in 23 mounting styles, and four different rod ends. (The S-P Mfg. Corp.)

For free copy circle No. 26 on postcard

Drill, Tap Units

A number of accessories to vary the standard cycles of a line of hydraulic drilling and tapping machines are illustrated in a bulletin. They are a time delay and reverse, a jump feed cam, a reverse feed mechanism, a hydraulic tapping unit, a lead-screw tapping attachment, sequence drill and tap spindles, and a step drilling unit. (Baker Bros., Inc.)

For free copy circle No. 27 on postcard

Ferrous Metallurgy

"Basic Guide to Ferrous Metallurgy" is a four-color reference chart. It represents the principal characteristics of steels to 2900°F. The various important working zones are shown, and a diagram indicates the change in grain size with temperature. A line of temperature-indicating crayons, lacquers, and pellets is cataloged on the reverse side. (Tempil Corp.)

For free copy circle No. 28 on postcard

Specimen Abrasives

Polishing cloths, abrasives, supplies, and apparatus for preparation of specimens for metallography are cataloged in a 28-page booklet. Various grinding and polishing procedures are discussed in some detail. (Buehler Ltd.)

For free copy circle No. 29 on postcard

Welding Turning Rolls

A bulletin describes a complete line of turning rolls for steady, positive rotation of cylindrical workpieces for mechanical welding. Capacities range from 2½ to 600 tons. There are rubber-tired and steel-wheeled models. (Aronson Machine Co.)

For free copy circle No. 30 on postcard

Stud-Welding Fasteners

Complete standard designs and specifications for stud-welding fasteners are presented in a 48-page booklet. The stud-welding system is described, and equipment for this welding is illustrated. (Write on letterhead to KSM Products, Inc., Merchantville 8, N. J.)

Spotwelding Control

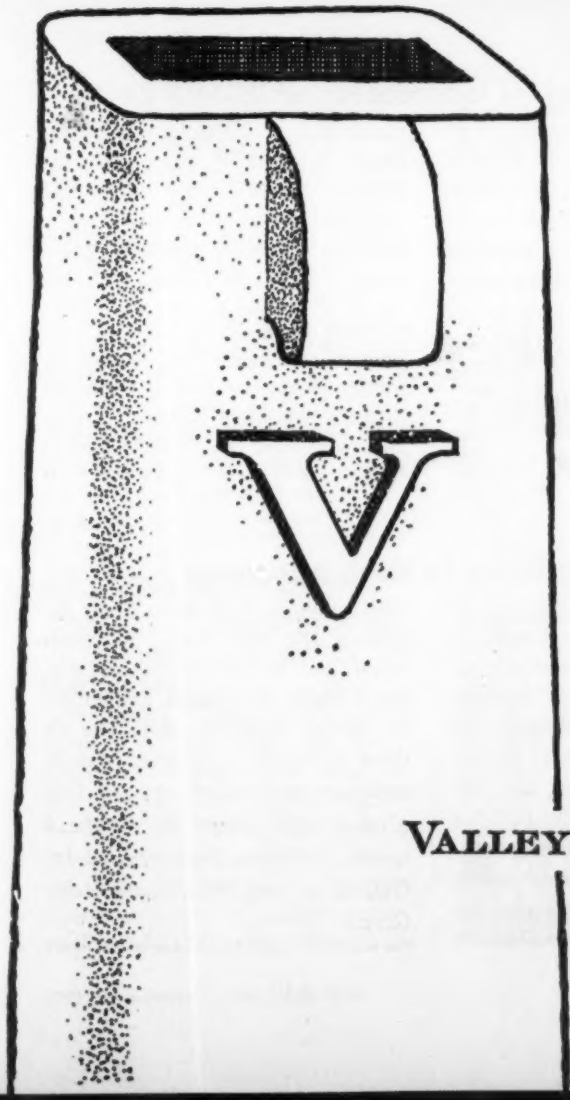
A control for spotwelding uses the feedback principle to produce spot-welds of high quality. It overcomes the different variables of the process which lower quality. A four-page brochure describes it. (The Budd Co.)

For free copy circle No. 31 on postcard

Fine-Hole Driller

A machine which can drill holes from 0.002-in. diam up in ultrahard materials is described in a four-page brochure. The drill spindle combines high-speed rotation with axial vibration. The machine is automated for very high production. (Mecanique et Plastique S.A., Geneva, Switzerland)

For free copy circle No. 32 on postcard



Tomorrow

we'll harness the energy of the sun.....

but even then

steel will be poured into

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New Equipment and Machinery

Punch Presses Feature Simple Operation

A 12 - ton - capacity hydraulic punch press is simple to operate, and offers a number of other advantages. Adjustable strippers take all sizes of punch-and-die sets up to maximum size. The only moving part in the press is a direct-acting hydraulic cylinder. Throat depth is either 12 or 24 in. Capacity is 3/32 to 4 in. in mild steel with round die sets, and 2½ in. with square die sets. A large clamp bar arrangement for more positive holding of punches replaces the conventional setscrew grip. These presses come with either 1½- or 3-hp, 1800-rpm motors, 220/440 v. They deliver 1½-in. stroke, 9 spm at 1½ hp, 15 spm at 3 hp. They can be used in combination with an angle-iron shear or a notcher-bend-cope press of the same make. (W. A. Whitney Mfg. Co.)

For more data circle No. 66 on postcard, p. 127

Works With Control Increments of 25-Millionths

A machine uses numerical control for production with the incredible precision required for Space-Age parts. It is an ultra-precision grinding, turning, and boring machine which can work parts like the hemisphere pictured, or grind highly accurate template contours. The main slide and cross-slide are controlled in increments of 25-millionths, on automatic tape control or during manual setup. Employed for high precision and minimum friction are hand-scraped ways, precision roller bearings on flat and V-ways, and recirculating-ball-type lead screws. Building - block - type reciprocating grinding head and turning and boring head are interchangeable. Temperature is exactly controlled. Tolerances of 1-tenth can be held in routine production of templates, and 2-tenths in contour boring and turning operations. (Ex-Cell-O Corp.)

For more data circle No. 67 on postcard, p. 127

Grinds Small-Lot Work to High Accuracy

A precision cylindrical grinder grinds small-batch work to extreme accuracy. Wheelhead infeed is graduated in increments of 20 - millionths. Roundness accuracy is 10-millionths on dead centers, 50- on a live standard workhead, and 10- with a special live spindle. Finishes of less than 2 microinches are obtainable. The spindle has automatic adjustment of bearing pressure for different spindle speeds. Oil-bath lubrication is used throughout, including the slide-ways, the feed-screw, and the feed handwheel bearing. Chucks, face plates, and collets are easily interchangeable. The dc drive motor has 6 different speeds, and there are two belt speeds. This gives a wide range of workhead speeds. Grinding capacity is 3 in. OD, 12 in. long. (Micromatic Hone Corp.)

For more data circle No. 68 on postcard, p. 127

Machine-Tool Control

A 2-axis numerical machine-tool control provides discrete positioning for all types of machining operations. A photocell tape reader speeds the machining process by "reading ahead" on the tape. A creep-traverse drive unit insures accurate positioning every time with high-speed positioning at 180 ipm. Repeatable accuracy is 0.0002 in. or better. A third axis feed control can be added if desired. (Hughes Aircraft Co.)

For more data circle No. 69 on postcard, p. 127

Short-Run Punch Press

A single-station punch press is designed for short-run work. With 15-ton capacity, it has very fast punch-and-die changing facilities. Holes up to 3½-in. diam can be pierced in work up to 24 x 28 in. in a single handling. Work can be

located using either a pantograph follower gage and template arrangement, or dimensional stops on a rack graduated in two dimensions. Proper changing of punches and dies is insured by a color-coding system. (Wiedemann Machine Co.)

For more data circle No. 70 on postcard, p. 127

Heat-Treat Furnaces

One model of heat-treating furnace has been re-engineered to operate as a modified hearth-type furnace in the 2250° to 2400°F range, using quiet, atmospheric gas burners, thus permitting wider usage for heat-treating and general metalworking and heating applications. A venturi air mixer burner design eliminates the need for blowers, compressed air, or other power. Muffles and automatic temperature

Ideal for tool and parts rooms, cafeterias, etc.

KINNEAR Metal Rolling COUNTER SHUTTERS

½ size

Section of Kinnear midget-slat in extruded aluminum

Straight up-and-down shutter action — *no space wasted.*

Coils completely out of the way—"out of sight" when raised.

Smooth, clean-lined beauty when closed — blends with any surroundings or decor.

These and other features make Kinnear rolling shutters ideal for any counter area. Slats of extruded aluminum, or roll-formed of aluminum, steel or other metals, interlock into a smoothly coiling curtain — a closure principle *originated by Kinnear!*

Kinnear "midget" slats feature a *flat* outer surface that stays dust-free... assures a neat, clean-cut appearance... provides full protection when closed . . . can even be installed to "disappear" into ceiling areas in most new construction.

Kinnear midget-slat counter shutters are ideal for openings up to 20′ wide (shutters 14′ wide or more operate by hand-crank). The shutters can be used in openings of any practical height.

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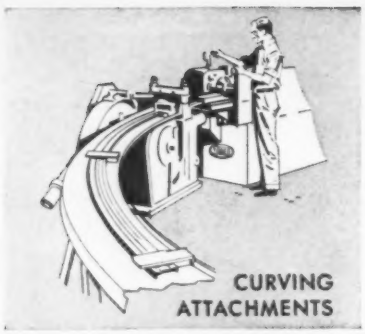

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EQUIPMENT

for profitable mass production

High speed, YODER Cold Roll-Forming machines are the most economical method for mass producing structural or ornamental shapes. One machine with one operator can form up to 40,000 feet of shapes per day. Even on a part-time basis, a YODER Cold Roll-Forming machine can prove to be a profitable investment.

YODER flexibility works for you too, curving, coiling, ring forming, multiple roll-forming and embossing—on a wide variety of metals—can be incorporated into your production line. Practical, YODER-engineered design minimizes maintenance and downtime... assures uniformity, accuracy and reliability of your end product.

In addition to Roll-Forming machinery, YODER also makes a full line of Rotary Slitting equipment, Pipe and Tube mills. Send for the fully descriptive Cold Roll-Forming Book.

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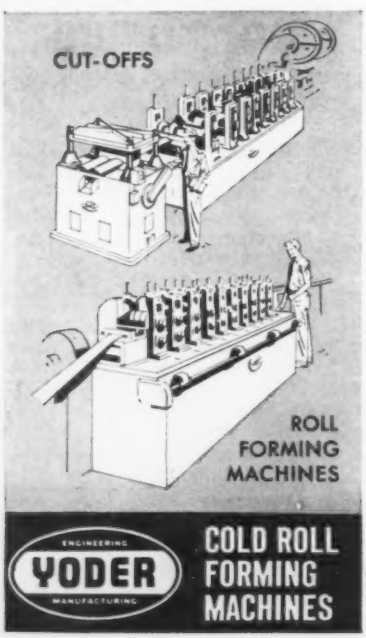


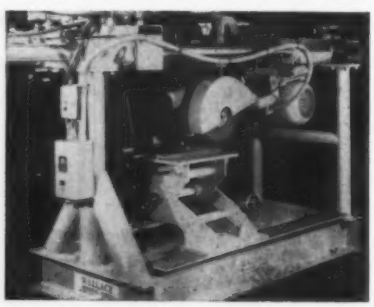
NEW EQUIPMENT

controls are available as optional equipment. There are four sizes. (Charles A. Hones, Inc.)

For more data circle No. 71 on postcard, p. 127

Abrasive Cutoff Machine

An oscillating, traversing abrasive cutting unit is designed to handle large structural shapes, as well as plates and other metal sections. Three models, with 20-, 26-, and 34-in. wheels, have 24-, 30-, and



36-in. strokes. respectively. Fine finish and fast cutting are characteristics. Standard channels, 60 lb per ft, have been cut in 60 seconds. The oscillating wheel's ability to "sense" its own best cutting rate prevents overloading. (Wallace Supplies Mfg. Co.)

For more data circle No. 72 on postcard, p. 127

Cooling Chamber

An environmental chamber with 280-cu ft interior capacity has the ability to cool a 20,000-lb piece of steel 215°F with perfect control of environmental conditions to prevent shock to the metal. (Webber Mfg. Corp.)

For more data circle No. 73 on postcard, p. 127

High-Speed Hobbers

A line of four basic models of high-speed hobbing machines combine versatility with high capacity. Hob spindle speeds and axial and radial feeds are infinitely variable. The machines can be operated as either automatic single-cut or two-cut machines, for step-hobbing, and with automatic variation of feeds and speeds within a work cycle. This last feature enables rough and finish hobbing in the same cycle. Built for maximum rigidity and minimum vibration, these machines offer high productive capacity, accuracy, and tool life expectancy. Automatic lubrication is featured. The four models are for maximum gear diameters of 10, 16 (two models), and 24 in. (Michigan Tool Co.)

For more data circle No. 74 on postcard, p. 127

Hydraulic Drawbench

A 10,000-lb drawbench is designed primarily for plug and bar drawing of seamless and welded stainless and alloy-steel tubing of ¼- to ½-in. diam, but can also be used for other metals or to meet unusual operating conditions. A hydraulic cylinder drive, adjustable for draw and return speeds from 0 to 75 fpm, eliminates the pulsations inherent in chain-type drawbenches. The operation may be stopped at any point for inspection or adjustment. (Lombard Corp.)

For more data circle No. 75 on postcard, p. 127

Sorts Metal Parts

A magnetic meter rapidly sorts mixed lots of metal parts, using the eddy-current principle of different responses from different metals. It is also useful for testing both ferrous and nonferrous parts for heat-

treatment condition, hardness and strength, chemical purity, and presence of decarburization. Measurements are quickly made by touching a probe to the surface tested. An alarm light signals conditions above and below pre-set tolerances, and

thus speeds sorting. Various plug-in scales are available for different metals and conductivity ranges. The unit is sensitive—hardness differences of a few points Rockwell, or slight alloy differences, appreciably change meter readings. (Metrol, Inc.)

For more data circle No. 76 on postcard, p. 127

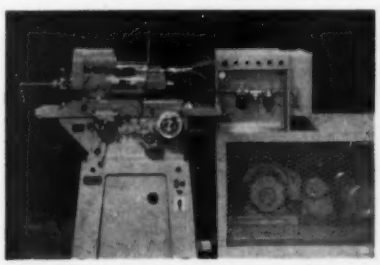
Plastic File Handles

Comfortable plastic handles are now standard on a line of files. By facilitating the correct grip, they increase filing efficiency, and being square, they prevent round files from rolling on the workbench. (Nicholson File Co.)

For more data circle No. 77 on postcard, p. 127

High-Speed Grinder

A high-frequency spindle running up to 100,000 rpm is now offered for a standard internal grinder. Such speeds improve cutting performance of small grinding wheels and carbide burrs, and permit good tolerances on small-hole grinding. Oil-

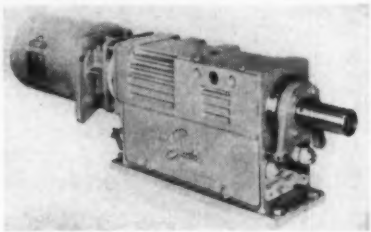


mist lubricated and water-cooled, the spindle handles holes from ⅛- to 3-in. diam with micro-finishes. Fine infeed, ranging from 0.00001 to 0.0006 in., insures successful grinding of thin-wall pieces. (Rivett Lathe & Grinder, Inc.)

For more data circle No. 78 on postcard, p. 127

Drill Unit

A building-block air-hydraulic drill unit for automatic drilling and tapping machines of all types features compact size and great versatility and adaptability. Using 80-psi air, it has 0- to 4-in. spindle travel, capacity to ⅝ in. in mild steel, and torque to 500 in.-lb. Speeds run from 455 to 8750 rpm, depending on motor used. Feed is adjustable to 80 ipm, and rapid approach to 440 ipm. Return rate is adjustable



to 330 ipm. Optional is a back feed adjustable to 50 ipm. Depth control is accurate to five-tenths. (The Hartford Special Machinery Co.)

For more data circle No. 79 on postcard, p. 127

70,000-rpm Grinder

A hand-held, light-duty grinder runs at 70,000 rpm, and is specially designed for tool and die makers requiring a grinder for intricate hand work. It comes with all accessories and tools, and grinds, de-

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Quality Gears for over 65 years

NEW EQUIPMENT

burrs, cuts, polishes, and engraves. Running cool, it blows chips away from the work. (Newage Industries)

For more data circle No. 80 on postcard, p. 127

Shape Straightener

A shape straightener is designed for high-speed straightening of steel and nonferrous flats, squares, hexagons, angles, and similar sections. An example of its work is straightening ⅜- to 1¾-in. aluminum-alloy hex and square stock at 300 fpm. A larger version handles ½- to 2½-in. stock. (Sutton Engineering Co.)

For more data circle No. 81 on postcard, p. 127

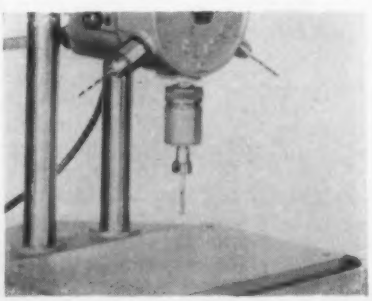
Abrasive Specialties

Resin-bonded depressed-center and cup wheels have been added to a line of abrasive specialties for portable right-angle grinding. These wheels are made by a special process which positions the grit particles for greater concentration and stands them on end to produce many more cutting edges. Free samples are available. (Abrasive Co. of America)

For more data circle No. 82 on postcard, p. 127

New Tapping Head

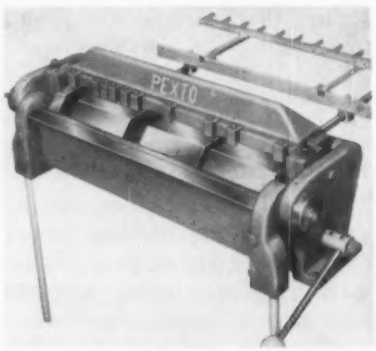
A new tapping head increases the tapping capacity of a bench model turret drill, in steel, from #0-#6 to a full range from No. 00 to No. 10-24 taps. It is manufactured by Tapmatic Corp. Featuring an axial floating drive spindle and supersensitive spring-loaded ball clutch, it eliminates numerous problems associated with conventional tapping attachments. Driving torque and reversing torque are adjusted prior to tapping, and cannot change during operation. The tap instantly stops when dull, loaded, or bottomed. (Burgmaster Corp.)



For more data circle No. 83 on postcard, p. 127

Box and Pan Brake

A box and pan brake handles sheet metal up to 16-gage. A back gage permits flip-over gaging and gives 0- to 24-in. positioning. The apron is adjustable for alignment, and can drop to produce slight radius bends or double hems, or reverses for narrow reverse bends to ¼ in. Precision-ground fingers form ¾ to 24 in. in ¼-in. increments. The stop collar is adjustable from 0° to 135° for accurate duplication of bends. (The Peck, Stow & Wilcox Co.)



For more data circle No. 84 on postcard, p. 127

Vacuum Heat-Treater

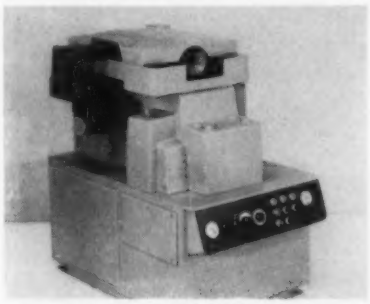
An automatic high-vacuum, cold-wall-type furnace has a workspace 10 in. in diam and 14 in. deep, maximum operating pressure of 0.1 micron Hg, 25-kw input, and maximum operating temperature of 2500°F. It is adaptable for high-temperature copper or nickel brazing of stainless assemblies, and for annealing, hardening, tempering, and drawing of all types of metals. Manual operation is possible. Positive safety features are built in. (Ipsen Industries, Inc.)

For more data circle No. 85 on postcard, p. 127

Drill Pointer

A precision drill pointer handles drills from 0.032 to 1.5 in. diam, conventional or helical. Points are

concentric within two-tenths. Four interchangeable workheads cover the diameter range. After grinding, drills are automatically ejected. Small drills can be pointed in three seconds. Time interval between cycles is adjustable for different sizes. An automatic self-compensating wheel dresser is featured. A pressure coolant system is provided. (Winslow Product Engineering Corp.)



For more data circle No. 86 on postcard, p. 127

DC Rectifier Lines

Two new lines of 250-volt dc silicon rectifiers are available, one for heavy-duty steel-mill and industrial applications, and the other for general-purpose operations. The heavy-duty units are available in seven ratings from 400 to 2000 kw, and the general-purpose units in four ratings from 150 to 300 kw. The rectifier consists of incoming line, transformer, rectifier, and dc breaker sections assembled on three related bases for ready installation. (Allis-Chalmers)

For more data circle No. 87 on postcard, p. 127

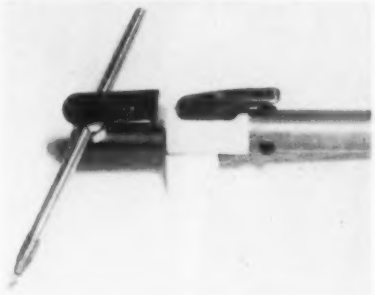
Recorder-Controller

A recorder-controller combination controls up to six points and records up to 24 points, thus replacing up to six individual recording-controlling units. It features the ability to operate from either one or two separate thermocouples or other inputs per point. This provides positive protection against failures of either half of the system, when the dual inputs are used. Both on-off and proportional electric control are available. Pneumatic control can be obtained by the use of electro-pneumatic converters. (Daystrom, Inc.)

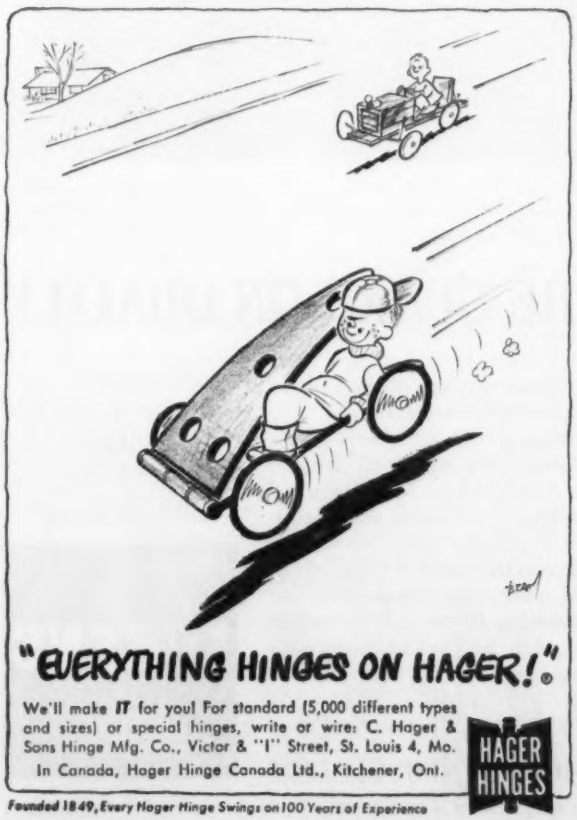
For more data circle No. 88 on postcard, p. 127

Welding Torch

A heavy-duty welding torch is for uses requiring air on both sides of the electrode. It takes ½- or ⅝-in. electrodes. Primary applications are flash removal, cutting holes, or similar jobs requiring frequent reversal of travel. It requires only compressed air and welding current to cut or gouge any metal. (Arcair Co.)



For more data circle No. 89 on postcard, p. 127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Protecting product quality is the responsibility of Lukens' Metallurgical Division. Four members of this expanded control team are, left to right: Sam Lemmon, Metallurgical Service; Lou Mandich, Manager; Howard Turner, Inspection; and Joe Althouse, Chief Metallurgical Engineer.

LUKENS STRENGTHENS THE GUARD ON QUALITY

To the steel buyer, Lukens' new ranking as a steel plate producer means more than increased tonnage. It promises complete confidence in buying decisions. For, together with the expansion of its steel making facilities, Lukens has strengthened its control over plate quality at every step—from open hearth to customer's shop.

The men assembled above in Lukens' new Physical Testing Laboratory spearhead this increased control. Working with the industry's broadest range of plate materials—from ordinary carbon steel to ultrasonically tested hullplate for nuclear submarines—these experts represent tne emphasis Lukens places on dependable plate quality.

Now consolidated into one closely working team are these vital functions: Inspection, Plant Metallurgy, Metallurgical Development, Quality Control and Metallurgical Service. Under Lou Mandich's direction, and together with Lukens' other operating and marketing groups, they are successfully pursuing the overall aim of our expansion program: *capacity and quality levels to meet the growing needs of our plate fabricating customers.*

Lukens Steel Company, Coatesville, Pa.

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The Iron Age Summary

Auto Demands Tighten Market

If automakers are able to get all the steel they want to meet first half production schedules, it will be rough going for smaller consumers.

Mill shipments are picking up. But inventory balancing is taking a lot of steel before production can be scheduled with confidence.

▪ Availability of steel for many steel users in early 1960 depends on whether automakers can reach their ambitious production goals.

The auto industry will try to obtain nearly 30 pct of total steel shipments. This will be needed to sustain production of nearly 2¼ million cars in the first quarter of 1960.

Bigger than 1955—It's pointed out that the auto industry normally takes from 15 to 20 pct of steel shipments. In 1958, it's share of the steel market was about 17 pct. But in record-setting 1955, automakers took 23 pct of steel shipments.

The automotive demand will keep the market vise-tight for the products in greatest demand by automakers. These include cold and hot-rolled sheet, cold-finished strip, and certain grades and types of bars, particularly forging bars and billets.

Railroad Factors—Two developments in the railroad industry will affect steel supplies. First, a shortage of rail cars will hamper steel shipments, particularly in the east. Second, railroads have come in with big orders for cars, further tightening the market for light plate and structurals. New car orders, not yet announced under the industry's system of disclosing orders, may have hit 8000 last month.

Mill shipments are gaining ground, continuing the better-than-expected recovery of the steelmakers. They are still lagging behind ingot production, but are approaching 2 million tons per week. December should see 8 million tons shipped, The IRON AGE predicts.

Scheduling Problems—This rate of shipments is not yet reflected in immediate manufacturing schedules. This is because inventories and pipelines were so depleted that stocks must be put in balance before full-scale operations are scheduled.

Many consumers are finding it tough to plan ahead because of differences among producers on scheduling shipments. Some are clearing up third quarter orders first; others are dropping the third quarter entirely.

Meanwhile, uncertainly over the steel negotiations contributes to confusion of the market. Fear of a new walkout after 80 days of Taft-Hartley injunction is not dissipating, particularly in view of recent mediation efforts.

There is little hope of a negotiated settlement. With no yielding in sight on the controversial 2-B local practices clause, the probability of a "mandated" settlement grows. If this occurs, the industry side will get the worst of it.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,661	Last Week 2,661	Month Ago 368	Year Ago 1,985
Ingot Index (1947-1949=100)	166.7	166.7	22.9	123.6
Operating Rates				
Chicago	92.0	91.0	5.5	85.0
Pittsburgh	95.5	93.5*	4.0	70.0
Philadelphia	102.0	100.0	12.0	73.0
Valley	89.0	88.5*	10.0	53.5
West	92.5	89.0*	0.0	84.0
Cleveland	95.0	92.0*	1.0	69.5
Detroit	98.0	93.0*	25.0	93.0
Buffalo	105.0	105.0	0.0	66.0
South Ohio River	100.0	98.0*	75.0	79.0
South	86.5	87.0	12.0	65.0
Upper Ohio River	94.5	92.0*	55.5	86.5
St. Louis	102.0	103.0*	96.0	77.0
Aggregate	94.0	94.0	13.0	73.5

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$42.50	$43.50	$46.17	$39.83
No. 2 bundles	$28.83	$29.83	$31.50	$28.17
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.80
Copper, electrolytic	33.00	33.00	30-33	29.00
Lead, St. Louis	12.80	12.80	12.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.00	100.00	101.375	99.375
Zinc, E. St. Louis	12.50	12.50	12.50	11.50

A New Buying System Works

E. L. Bastian, purchasing agent, Lake Shore, Inc., has combined negotiating and low bid purchasing tactics.

The result is that his firm has developed a sound and effective purchasing system.

▪ Competitive bidding vs. negotiated purchases? How about a little of both? E. L. Bastian, purchasing agent, Lake Shore, Inc., Iron Mountain, Mich., combined the two. Rather than a set rule that all purchases will be negotiated, or that all bids will be accepted on a low bid basis; Mr. Bastian concluded that competitive bidding can't be the whole answer.

The resulting system requires careful analysis and some pencil work before negotiation begins. But it's highly effective. In the present Lake Shore system, initial bids are accepted on a competitive bidding basis. The resulting bids are examined for possible bulk purchase savings.

In order to avoid "over-buys" that could result in some obsolescent materials standing in inventory, Mr. Bastian talks with engineering and sales departments. He learns whether the same equipment being purchased might be used in some other Lake Shore product at a later date.

Face-to-Face—Vendors are given about a two week period to submit bids. When bids are received, they are checked against specifications in the original purchase order. When the two or three lowest bids have been tabulated, the purchasing agent negotiates with the low bidders. Possible savings by bulk buying are again rechecked.

In short, face-to-face contact with your vendors puts business on a personal basis often lost when bids are determined largely on "low bid" basis.

Lake Shore had an additional problem, in that the company manufacturers a diversity of products. And many of these products must be produced to almost custom-built specifications. The product range is from mining equipment, to plate glass polishing equipment, to marine deck machinery. The company also produces industrial conveyor equipment.

Careful Control—With this wide a product range, and much of the output specially engineered for individual Lake Shore customers, it can be seen that purchasing can fit no concrete formula.

Similarly, the wide product range imposes a heavy workload on followup. Mr. Bastian breaks down his followup files by individual jobs. Beginning with a base inventory, with a few stock items, he can apply inventory control rules.

But the heavy bulk of purchases will require careful study of engineering specifications of the item to be purchased. Careful attention must also be given to the amounts required, and a followup system that can give a report on availability of materials and components for each job.

Individually—Emphasis falls on the "individual job" approach to inventory control, rather than predetermined stock levels of standard parts. And it is in this type of atmosphere that negotiated bidding seems to be most effective.

Following up on the "individual job" basis, shortage reports are tabulated by the job to which they apply. Expediting materials which are in short supply can then be quickly related to the final delivery dates for that product.

E. L. BASTIAN: He combined two purchasing methods.

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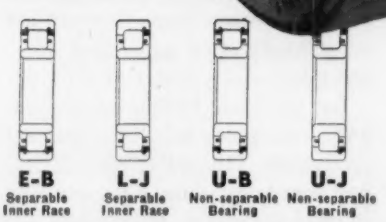

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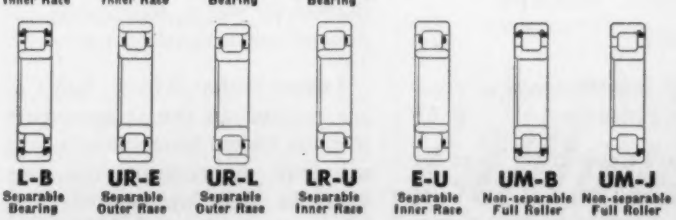

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Steel Users Push For Supplies

Many users have trouble getting the steel needed to keep production moving.

Timing of mill deliveries is often critical.

▪ Steel users are having a tough time putting together enough steel to keep production lines moving.

The troubles come from a variety of reasons. Even if some steel products are available, lack of others means delay. This gets complicated when a buyer deals with several different mills. He must try and dove-tail various mill shipments to get needed steel.

Buyer Pressure — A mill which operated during the strike says customers are applying lots of pressure in this direction. "The buyers hate to pressure suppliers who just started shipping," says the sales manager. "But they ask us if we can postpone one order and push another forward. Or they want to change specs and grades on orders being rolled."

Piecemeal Basis — Many customers are using warehouse supplies, plus odds and ends, just to keep manufacturing. Those having difficulty include auto parts makers, appliance makers, and stampers. Some automakers are not attempting assembly on a piecemeal basis. They are waiting until steel pipelines fill up before cutting loose with assembly work.

Mill rolling schedules are also hampering steel users. Bar orders, for instance, can't be filled until the sizes wanted are reached in mill rolling schedules. This means steel urgently needed may not be available for several weeks or more.

Structurals—Market is falling off seasonally, producers say. Still, most order books are filled for the first quarter. An **Eastern** mill says bookings beyond March are slim. Fabricators have placed orders for mill-size lengths in many cases. Later, these orders will probably be "refined" before delivery to sizes needed on actual jobs. Or some of the tonnage might be deferred until fabricating improves.

Freight car builders are putting on heavy pressure for mill orders. With carbuilding at strong levels, more structuals are wanted now.

Pipe and Tubing — Oil country goods are still not showing the strong demand noticed for other products. Customers are not pushing for delivery. But mill stocks are not large. One **Pittsburgh** mill says its downriver stocks are only 10 pct of normal. Other pipe products —including standard pipe and tubing—are tight.

Pig Iron—Producers say demand is only fair. Gray iron founders are busy, but steel founders are less active. In **Eastern** markets, Alan Wood Steel Co. is now offering an intermediate low phos at $73 a ton. Producing point is Swedeland, Pa.

Sheet and Strip — Auto companies, appliance makers, and other sheet users are trying to get conversion time on mill schedules. Most conversion space is already committed. Premiums of up to $100 a ton are being paid on conversion tonnage.

There is no open space on many mill books until March for any grade of sheet and strip. Some decisions made before the strike are now coming back to haunt sheetmakers. Fearing order cancellations if there was no strike, some mills booked tonnage on an irrevocable basis for both buyer and seller. Now these orders must be cleaned up before new orders are tackled. Other mills, feeling third quarter business would fall off, deliberately overbooked. Now these orders, too, must be shipped out first.

Plate—Mill bookings extend out for the next four to six months. Some **Eastern** producers won't consider orders beyond that point. An **East Coast** mill which operated through the strike is thinking of blanking out April to clean up backlogs. **Midwest** plate users find they can't get delivery on new orders before April.

Bar — New orders for hot-rolled and cold-finished bar are being entered strictly on a quota basis. With first quarter tonnage booked, mills are filling up fast on second quarter orders. In many cases, they are not yet officially open for second quarter orders.

Bar users are having trouble getting tonnages needed for curren' production. Depending on mill rolling schedules, some sizes can't be shipped for weeks. Reinforcing bar demand has dropped off seasonally.

Lukens Settles—Lukens Steel Co. has reached an interim agreement with the United Steelworkers which will keep the company operating after the T-H injunction expires. Local work issues have been settled.

PURCHASING AGENT'S CHECKLIST

Metals still lead in chemical processing applications. P. 68

New features result in big boom for forming presses. P. 85

How to get more from your maintenance dollar. P. 93

COMPARISON OF PRICES

(Effective Dec. 8, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Dec. 8 1959	Dec. 1 1959	Nov. 10 1959	Dec. 9 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Dec. 8 1959	Dec. 1 1959	Nov. 10 1959	Dec. 9 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$42.50*	$44.50	$47.50	$42.50
No. 1 steel, Phila. area	44.50	44.50	46.50	33.50
No. 1 steel, Chicago	40.50*	41.50	44.50	43.50
No. 1 bundles, Detroit	40.50*	41.50	42.50	35.50
Low phos., Youngstown	49.50*	48.50	51.50	43.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	51.50
No. 1 mach'y cast, Phila.	54.50	54.50	53.50	48.50
No. 1 mach'y cast, Chicago	60.50*	62.50	64.50	53.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$42.50*	$43.50	$46.17	$39.83
No. 2 bundles	28.83*	29.83	31.50	28.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.50-15.50	$14.50-15.50	14.50
Foundry coke, prompt	18.50	18.50	18.50	18-18.50

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	30-33	29.00
Copper, Lake, Conn.	33.00	33.00	33.00	29.00
Tin, Straits, N. Y.	99.00†	100.00	101.375	99.375
Zinc, East St. Louis	12.50	12.50	12.50	11.50
Lead, St. Louis	12.80	12.80	12.80	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites
Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Scrap Market Hits Critical Point

First big buys in Pittsburgh showed prices down a little but no national pattern has been set.

Two factors still influence mills' buying: Possibility of a new walkout, and finances to buy.

■ The market is at a critical point. The first major buys of the post-strike period appeared and it was time for the market to either hold or break.

First major orders in Pittsburgh established a pattern, down only a small drop from a week ago. First reports indicated that other attempts to buy were resisted by brokers.

But across the steelmaking areas, the level was yet to be established. Scrap still moved at lower prices in many areas, and the market remained to be resolved.

Two Factors—In some areas, uncertainty over a possible second walkout kept mills reluctant to jump into the market for big orders. The idea of a heavy inventory piled in the yards was not attractive.

Another factor: Some mills, hard-hit financially by the strike, did not find it easy to obtain financing for major scrap purchases, even if they considered present levels attractive.

Pittsburgh—Prices moved down again here as mills were able to buy openhearth grades at $1 to $2 under old levels. Combined amounts were estimated at 40,000 tons or better. This, along with reduced prices, may have moved the market back into balance. There were reports that mill efforts to buy No. 1 heavy melting had met with broker resistance.

Chicago — Scrap continued to move on reduced prices. Tonnages appear to be shrinking, however. New factory bundle lists closed during the week at $42.30 on track. Prices paid for railroad scrap continue strong, although No. 1 RR heavy moved from the roads at reduced prices. Fresh confusion hit the market when local mills purchased small tonnages at prices varying as much as $2. Correction: Price of scrap rails, random length in Dec. 3 issue should have been $56 to $57.

Philadelphia — Mills are buying cautiously in limited tonnages. Dealers feel arrival of winter weather may push mills into more ordering. Meanwhile, export helps hold up prices for steelmaking grades. Several boats are now loading with others due in the next month. Mills were able to buy No. 2 bundles at $1 lower.

New York—Business continues very slow here, with little buying. A new cast order confirms lower prices of last week. Counter to most areas, stainless grades here are moving well and prices are firm.

Detroit—There still haven't been any sizable orders. Mills are in good inventory position. They don't want to load up and get saddled with large stocks should another walkout occur Jan. 26. Dealers believe the market will lag until a final agreement is reached. Meanwhile, scrap generation will mount as car manufacturing resumes.

Cleveland—A weaker market has flushed out some new orders largely at prevailing prices. Brokers are covering them easily. One local mill bought prime grades through specified yards. Three Valley mills are also in the market. Electric furnace grades are still the most wanted.

St. Louis—Scrap prices again edged downward. However, demand and supply seem to be coming more into balance. There is a feeling that prices are nearing a leveling off position.

Birmingham — The market here is still soft and with very little movement. A Birmingham electric furnace cut its prices $2 per ton and a railroad list closed at $2 below the November price. The few sales of foundry grades were small and prices were unchanged.

Cincinnati — Area mills entered the market at quoted prices for prime grades, but got secondary grades $2 cheaper. Turnings also slipped $1.

Buffalo—Sales of No. 2 grades resulted in a decline of prices in these items. Primary grades are also down in a weaker market. Turnings and rail items are also down in sympathy. Cast remains unchanged.

Boston — Prices are off in line with price breaks in adjacent markets. There is no real activity here.

West Coast — The market is quiet. Mills are living off inventories; buying only small quantities. Exporters have Japanese orders for 153,000 tons for the first quarter. Correction: In the Dec. 3 issue, three prices were misquoted for Los Angeles. Correct prices were: No. 1 heavy melting, $41; No. 2 heavy melting, $39; No. 1 dealer bundles, $38.

Houston — The market appears depressed. The district mill still has not come into the market. Export is continuing, but not as briskly. However, export brokers are quoting prices well over domestic.

G.O.CARLSON Inc.

Mill Inventory of Stainless Steel Plates

Unsheared HRAP Plates

December, 1959

GAUGE	WIDTH	LENGTH
	TYPE 17-4 PH*	
3/16	53	113
1/4	74	80
7/16	40/50	50/60
1	26	73
1-3/8	25	85
1-1/2	12	56
	TYPE 17-7 PH*	
3/16	65/98	108/210
1/4	63/84	145/240
5/16	68	74
7/16	55	54
1/2	60/96	100/120
19/32	48	120
31/32	24	135
*Trademark of Armco Steel Corporation		
	TYPE 302	
3/16	84	195
1/4	96	170
5/16	96	280
3/8	84/96	260/350
1/2	96/97	280/310
5/8	96	290
3/4	60	96
1	96	186
1-1/4	62	330
1-1/2	36	150
	TYPE 304	
3/16	80/104	160/300
1/4	72/103	270/300
9/32	80/100	195/240
5/16	84/106	240/340
11/32	60	310
3/8	95/110	240/300
7/16	92	300
1/2	84/96	155/300
9/16	92/96	240/330
5/8	96/100	240/340
11/16	84/96	105/140
3/4	68/96	230/305
13/16	98	282
27/32	96	145
7/8	96/98	184/320
29/32	100	345
15/16	96	210
1	96/98	230/440
1-1/8	96	325
1-1/4	96	302
1-1/2	80/96	144/320
1-3/4	60	92
1-13/16	60	74
2	60/72	70/78
2-1/32	35/52	184/200
2-3/4	98	110
	TYPE 304-L	
3/16	54	192
3/16	72/96	144/290
7/32	60/68	195/243
1/4	72	156
1/4	88/105	145/310
9/32	96/147	138/284
5/16	96	200
11/32	80/106	190
3/8	81/108	170/330
13/32	94	280
7/16	69/106	105/275
17/32	73/100	134/233
1/2	96/108	210/260
9/16	91	260
5/8	75/96	153/320

GAUGE	WIDTH	LENGTH
	TYPE 304-L—CONTINUED	
11/16	96	264
23/32	98	126
3/4	60	172
13/16	94	230
27/32	67	248
7/8	96	278
15/16	75	270
31/32	62/92	168/191
1-1/8	96/98	165/198
1-1/4	96	240
1-1/2	96	240
2	80	205
	TYPE 309	
3/16	48	120
3/16	73/91	105/320
1/4	41/60	112/120
1/4	96	205/220
3/8	96	240
1/2	77/96	155/280
5/8	96	192
11/16	57	82
3/4	28/49	96
1-5/8	68	72
	TYPE 310	
3/16	48	120
3/16	72	104
1/4	72/95	200/240
5/16	63/82	185/240
11/32	96	125
1/2	99	260
2-1/4	25	48
	TYPE 316	
3/16	54	192
3/16	66	198
3/16	72	192
3/16	82/96	170/280
7/32	66/93	110/300
1/4	94/105	160/320
5/16	96	240/300
11/32	86/97	120/240
3/8	86/111	225/300
7/16	78/96	170/360
1/2	96/106	230/300
9/16	74/96	205/290
5/8	96	285
11/16	96	183
3/4	96	280
13/16	77	140
7/8	96/102	236/370
15/16	98	188
31/32	96	276
1	98	242
1-1/8	98	244
1-1/4	65/96	240/260
1-1/2	67	226
2	40	60
2-1/2	70	100
	TYPE 316-L	
3/16	72/90	150/170
7/32	93/110	118/120
1/4	72	156
1/4	72/108	156/300
5/16	70/96	240/295
11/32	92	210
3/8	72/96	200/250
7/16	76/96	122/240
1/2	96	200
17/32	100	135
9/16	96	303
5/8	96	240

GAUGE	WIDTH	LENGTH
	TYPE 316-L—CONTINUED	
11/16	96	138
3/4	84	251
13/16	96	310
7/8	98	214
15/16	96	275
1	96	248
1-1/8	88/98	250/280
1-1/4	98	360
1-1/2	93	276
1-3/4	83	98
2-1/4	63	170
	TYPE 317	
3/16	52	190
1/4	33/61	72/120
5/16	63/83	105/170
3/8	96	135
1/2	67	70
1-5/8	37	66
	TYPE 317-L	
3/16	83/93	150/324
1/4	68/74	235/323
5/16	42	130/309
3/8	88/100	101/109
13/32	100	200
7/16	47	100
1-1/4	32	136
	TYPE 321	
3/16	80	168
3/16	84/91	300/340
1/4	73/94	200/320
5/16	96	288
3/8	96	230
1/2	96	144
9/16	80	159
5/8	96	235
3/4	96	250
7/8	60/96	120/126
1	96	235
1-1/8	70	126
1-1/4	96	220
1-1/2	96	180
1-5/8	72	72
	TYPE 347	
3/16	48	123
3/16	91	135
1/4	72/96	240/300
9/32	94	118
5/16	96	300
11/32	72/98	177/209
3/8	96	240/330
7/16	96	205
15/32	93	128
1/2	94	240
5/8	96	325
11/16	70/100	104/235
3/4	57	120
7/8	63/80	160/190
1	96/98	170/228
1-1/8	52	56
1-1/4	96	240
1-1/2	97	170
1-3/4	55	64
2-3/4	35	50
	TYPE 405	
3/16	77/88	195/235
7/32	77	126
1/4	94	180
5/16	70/96	120/275
3/8	96	354
13/32	86	160

GAUGE	WIDTH	LENGTH
	TYPE 405—CONTINUED	
7/16	60/94	245/255
1/2	61/96	110/174
9/16	97	140
5/8	96	304
3/4	83	167
7/8	96	254
15/16	69	135
1	99	145
1-1/8	97	148
1-1/4	96	208
1-3/8	38	223
1-1/2	84	145
	TYPE 410	
3/16	72/91	190/295
1/4	73/100	275/290
5/16	95/96	173/365
11/32	97	160
3/8	94/98	130/278
7/16	74/96	139/310
1/2	73/98	200/275
19/32	92	350
5/8	96	180
21/32	96	375
3/4	96	199
13/16	104	120
7/8	96	149
1	33	196
1-1/4	98	189
1-5/16	55	170
1-1/2	68	176
1-3/4	60	62
	TYPE 430	
3/16	86/90	190/290
7/32	72/96	115/295
1/4	86/97	200/300
9/32	62	240
5/16	96/99	240/310
3/8	96/97	175/300
7/16	75/98	290/305
1/2	96	210
9/16	87	240
5/8	60/93	120/130
3/4	82	375
7/8	77	260
29/32	97	204
1	98	206
1-1/8	96	220
1-1/4	96	180
1-1/2	96	180
2	48	95
2-9/32	70	119
	TYPE 502-½ Mo	
	(This grade available in plate only. Our base price is 28.25¢.)	
3/16	88/94	235/300
1/4	79/102	225/280
5/16	78/85	169/338
11/32	92	300
3/8	72/96	250/360
7/16	96	138
1/2	96	179
9/16	94	140
5/8	96	240
11/16	66	76
3/4	96	295
7/8	36	230
1	76	96
1-1/4	80	154
1-1/2	72	144

Mill Inventory of Stainless Steel Heads

A.S.M.E. FLANGED AND DISHED

(1½" to 2" straight flange—annealed and pickled after forming for maximum corrosion resistance)

O.D.	GAUGE	304	304-L	316	316-L	347
8-5/8"	3/16"	8	10	2	10	
10"	3/16"	2	18	12	12	3
12"	3/16"	16	6	8	6	
12"	1/4"	2	8	4	12	
14"	3/16"	2	4	10	5	
16"	3/16"	2	9	10	4	
16"	1/4"	5	7	10	5	
18"	3/16"	0	1	13	11	1
18"	1/4"	12	7	11	8	
18"	3/8"	3	2	4	2	
20"	3/16"	7	11	10	1	
24"	3/16"	14	14	4	5	11
24"	1/4"	19	11	8	8	34
24"	5/16"	6	2	18	6	
24"	3/8"	4	4	2	3	
30"	3/16"	22	10	1	0	
30"	1/4"	0	7	9	4	3

O.D.	GAUGE	304	304-L	316	316-L	347
36"	3/16"	7	8	0	2	
36"	1/4"	16	4	8	6	2
36"	5/16"	3	3	2	2	
36"	3/8"	5	2	3	2	
42"	3/16"	9	0	6	4	
42"	1/4"	2	6	8	8	
42"	5/16"	0	0	4	0	
48"	3/16"	2	7	12	7	
48"	1/4"	5	10	9	14	2
48"	5/16"	6	5	8	4	
48"	3/8"	5	6	0	1	
54"	3/16"	2	4	2	4	
54"	1/4"	6	3	1	5	
60"	3/16"	7	4	4	6	
60"	1/4"	2	8	9	2	
60"	5/16"	1	0	0	1	
60"	3/8"	7	3	5	2	

O.D.	GAUGE	304	304-L	316	316-L	347
66"	1/4"	6	6	3	3	
66"	5/16"	0	2	0	0	
72"	1/4"	6	5	6	1	
72"	5/16"	6	2	6	2	
84"	5/16"	0	0	0	2	

STANDARD FLANGED AND DISHED

18"	1/4"	2	4	2	4
24"	3/16"	0	2	3	5
24"	1/4"	5	1	8	2
30"	3/16"	8	4	4	4
30"	1/4"	5	4	2	2
36"	3/16"	12	3	5	2
36"	1/4"	6	3	6	3
42"	3/16"	2	4	5	3
48"	3/16"	2	4	6	4
48"	1/4"	7	4	2	2
54"	3/16"	2	4	2	4

The stainless plates and heads listed above are typical of our current mill inventory; similar sizes are constantly being produced. Limited quantities of PH 15-7 Mo, 309 S, D 319 and D 319-L are on hand. Other grades—305, 309 SCb and 314—can be produced for specific orders. We will cut to your required sizes within 2 to 3 days, faster when required.

For latest information on exact quantities of stainless steel plates, tank heads and other available plate products, mail this coupon now.

G. O. CARLSON, INC. • 120 Marshalton Road, Thorndale, Pa.

Please send your Weekly Inventory Report to:

Name_____

Company_____

Street Address_____

City_____ State_____

SCRAP PRICES *(Effective Dec. 8, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	43.00 to 44.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	28.00 to 29.00
Low phos. punch'gs plate	52.00 to 53.00
Heavy turnings	37.00 to 38.00
No. 1 RR hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	58.00 to 59.00
Rails 2 ft and under	65.00 to 66.00
RR specialties	57.00 to 58.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	235.00 to 240.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. forge crops	54.00 to 55.00
Low phos. punch'gs plate, ¼ in. and heavier	51.00 to 52.00
Low phos. 2 ft. and under	49.00 to 50.00
No. 1 RR hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	55.00 to 57.00
Rerolling rails	63.00 to 64.00
Rails 2 ft. and under	62.00 to 63.00
Angles and splice bars	54.00 to 55.00
RR steel car axles	59.00 to 60.00
RR couplers and knuckles	51.00 to 52.00
No. 1 machinery cast.	60.00 to 61.00
Cupola cast.	54.00 to 55.00
Cast iron wheels	48.00 to 49.00
Malleable	62.00 to 63.00
Stove plate	50.00 to 51.00
Steel car wheels	51.00 to 52.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	47.00 to 48.00
Machine shop turn.	24.00 to 25.00
Mixed bor. short turn.	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	27.00 to 28.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	49.00 to 50.00
Low phos. 2 ft punch'gs	51.00 to 52.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	34.00 to 35.00
RR specialties	50.00 to 51.00
Rails 18 in. and under	67.00 to 68.00
Cupola cast.	44.00 to 46.00
Heavy breakable cast.	47.00 to 48.00
Cast iron car wheels	50.00 to 51.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	54.00 to 55.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	20.00 to 21.00
Low phos. 18 in. and under	48.00 to 49.00
Rails, random length	55.00 to 56.00
Rails, 18 in. and under	63.00 to 64.00
No. 1 cupola cast.	49.00 to 50.00
Hvy. breakable cast.	44.00 to 45.00
Drop broken cast.	59.00 to 60.00

Youngstown

No. 1 hvy. melting	$46.50 to $47.50
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	46.50 to 47.50
No. 2 bundles	30.00 to 31.00
Machine shop turn.	21.50 to 22.50
Shoveling turnings	26.50 to 27.50
Low phos. plate	49.00 to 50.00

Cleveland

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 dealer bundles	43.00 to 44.00
No. 1 factory bundles	45.50 to 46.50
No. 2 bundles	26.50 to 27.50
No. 1 busheling	43.00 to 44.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Cut structural & plates, 2 ft & under	50.00 to 51.00
Drop forge flashings	43.00 to 44.00
Low phos. punch'gs plate	45.50 to 46.50
Foundry steel, 2 ft & under	43.00 to 44.00
No. 1 RR hvy. melting	45.50 to 46.50
Rails 2 ft and under	65.00 to 66.00
Rails 18 in. and under	66.00 to 67.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	60.00 to 61.00
No. 1 machinery cast.	56.00 to 57.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	225.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 busheling	38.00 to 39.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	20.00 to 21.00
Low phos. plate	44.00 to 45.00
Structurals and plate, 2 ft and under	44.00 to 45.00
Scrap rails, random lgth.	42.00 to 43.00
Rails 2 ft and under	52.00 to 53.00
No. 1 machinery cast.	53.00 to 54.00
No. 1 cupola cast.	49.00 to 50.00

St. Louis

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	19.50 to 20.50
Shoveling turnings	22.00 to 23.00
Cast iron borings	25.00 to 26.00
No. 1 RR hvy. melting	45.00 to 46.00
Rails, random lengths	53.00 to 54.00
Rails, 18 in. and under	57.00 to 58.00
Angles and splice bars	50.00 to 51.00
RR specialties	50.00 to 51.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	45.00 to 46.00
Stove plate	44.00 to 45.00
Cast iron car wheels	48.50 to 49.50
Rerolling rails	63.00 to 64.00
Unstripped motor blocks	45.00 to 46.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	40.00 to 41.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	46.00 to 47.00
Structural and plate, 2 ft.	45.00 to 46.00
No. 1 RR hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	53.00 to 54.00
Rails, 18 in. and under	57.00 to 58.00
Angles and splice bars	49.00 to 50.00
Rerolling rails	61.00 to 62.00
No. 1 cupola cast.	54.00 to 55.00
Stove plate	54.00 to 55.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	32.00 to 33.00
No. 2 dealer bundles	21.00 to 22.00
Machine shop turnings	10.00 to 11.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	25.00 to 26.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	37.00 to 38.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	21.00 to 22.00
No. 1 bushelings	38.00 to 39.00
Drop forge flashings	38.00 to 39.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	23.00 to 24.00
Heavy breakable cast.	41.00 to 42.00
Mixed cupola cast.	48.00 to 49.00
Automotive cast.	53.00 to 54.00
Stainless	
18-8 bundles and solids	205.00 to 210.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	100.00 to 105.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Clean cast. chem. borings	18.50 to 19.50
No. 1 machinery cast.	41.00 to 42.00
Mixed cupola cast.	37.00 to 38.00
Heavy breakable cast.	36.00 to 37.00

San Francisco

No. 1 hvy. melting	....	$40.00
No. 2 hvy. melting	....	36.00
No. 1 dealer bundles	....	36.00
No. 2 bundles	....	22.00
Machine shop turn.	$17.00 to	19.00
Cast iron borings	17.00 to	19.00
No. 1 cupola cast.	....	47.00

Los Angeles

No. 1 hvy. melting	....	$40.00
No. 2 hvy. melting	....	38.00
No. 1 dealer bundles	....	37.00
No. 2 bundles	....	21.00
Machine shop turn.	$18.00 to	19.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	18.00 to	19.00
Elec. furn. 1 ft and under (foundry)	49.00 to	50.00
No. 1 cupola cast.	47.00 to	48.00

Seattle

No. 1 hvy. melting	....	$35.00
No. 2 hvy. melting	....	33.00
No. 2 bundles	....	22.00
No. 1 cupola cast.	....	36.00
Mixed yard cast.	....	36.00

Hamilton, Ont.

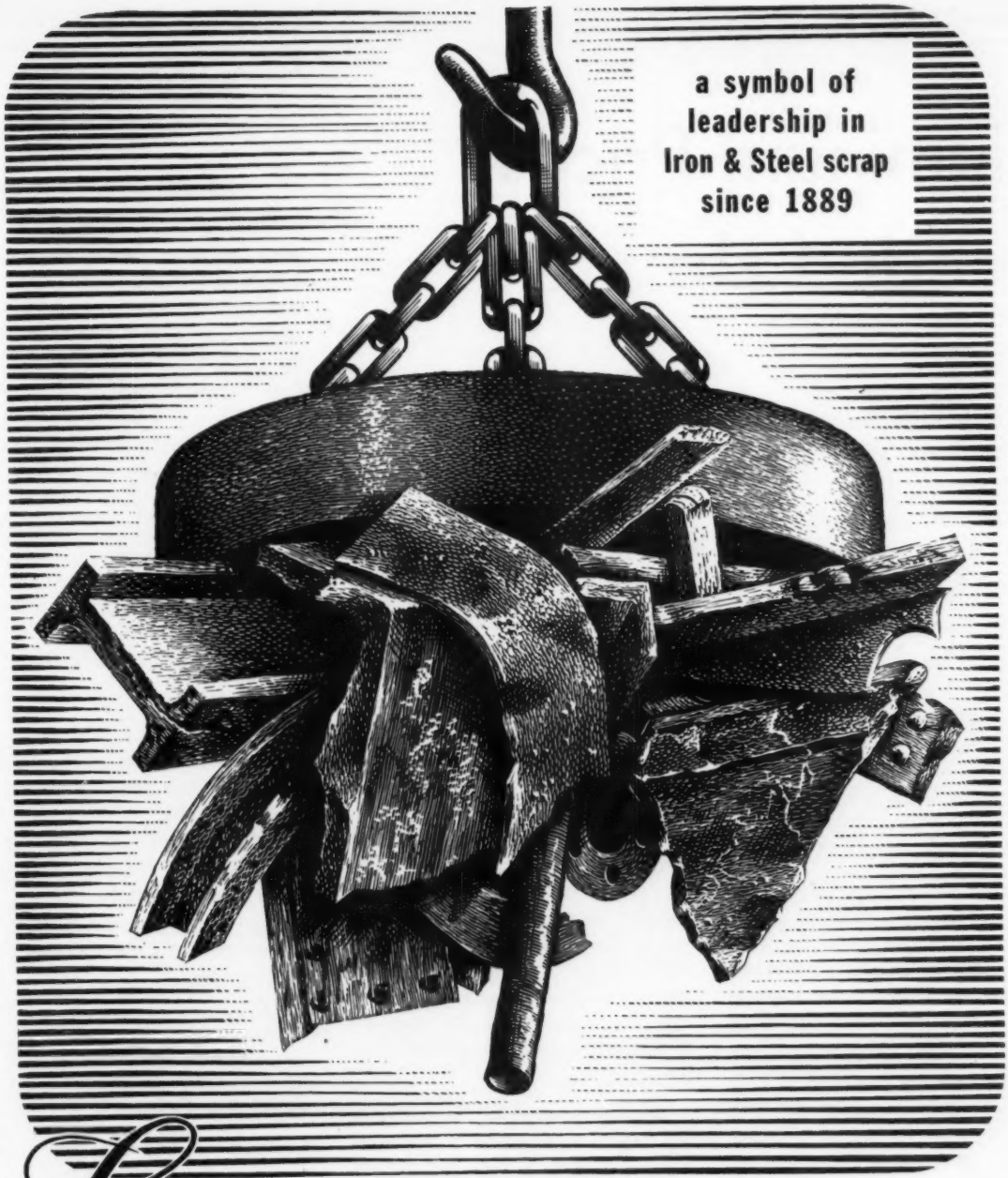
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$32.25
No. 2 hvy. melting	....	28.25
No. 1 dealer bundles	....	32.25
No. 2 bundles	....	24.00
Mixed steel scrap	....	24.25
Bush., new fact., prep'd	....	32.25
Bush., new fact., unprep'd	....	26.25
Machine shop turn.	....	14.00
Short steel turn.	....	17.00
Mixed bor. and turn.	....	13.00
Rails, rerolling	....	37.00
Cast scrap	$46.50 to	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$34.00
No. 2 hvy. melting	....	31.00
No. 2 bundles	....	20.00
Machine shop turn.	....	16.00
Shoveling turnings	....	20.00
Cut structural plate 2 ft & under	$48.00 to	49.00
Unstripped motor blocks	39.50 to	40.50
Cupola cast.	46.00 to	47.00
Heavy breakable cast.	34.00 to	35.00



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Aluminum Prices Headed Up

There is little doubt that the producers are pointing for a higher price.

But a labor settlement and a slightly firmer market will have to come first.

▪ The aluminum producers are moving toward a price hike. That seems to be the direction the industry is pointing.

Right now, just about any aluminum company executive can recite, and will, at least several reasons why the aluminum price must increase.

How Much? — Predicting how much at this point is sheer guesswork. Edgar Kaiser said that if his steel labor settlement were translated directly to aluminum, it would cost about 1¢ per lb more to make aluminum. Many observers are going along with this as the likely hike.

An economist for a major producer has been talking of a higher price in terms of a "restoration." The ingot price reached 28.10¢ per lb in 1957 before it started moving down to its current 26.80¢. This might suggest the producers are seriously considering more than a 1¢ per lb hike.

1957 Comparison—At any rate, the fact that the price is lower now than what it was in 1957, while costs are higher, is a prime argument of the producers for a higher price.

First, new contracts will probably be signed with United Steelworkers and the Aluminum Workers of America. This won't take long. Higher wages and fringes are almost certain. Best bet: Contracts will follow the Kaiser Steel-USW pact, with slightly smaller hikes because of some basic differences in the industries.

Retroactive, Too — Aluminum contracts have been extended since Aug. 1, with hikes to be retroactive. This means the producers will have to pay for almost five months' worth of production they have already sold. This point is likely to be heard more as producers prepare the ground for the increase.

Another restraining factor has been the softness of the market. But this is likely to fade before a price hike is made. Fabricators hedged in the first half against a possible strike, pushing shipments way up. They have been working some of this off since summer, dropping shipments below what had been expected.

Market Stronger—The market is starting to show signs of life. Production is up to a respectable 82 pct of capacity. Business may be strong enough to support the higher price.

An indication of how seriously the industry is counting on a higher price: A spokesman for one producer said that with the current cost picture the industry would have to either raise its prices or cut some expenditures, such as research and development. The industry has grown on the work of its R&D men, and knows it. Nowhere is an R&D budget less likely to be cut.

Some observers believe the higher price will not be across the board. They say the producers have set the pattern of letting highly competitive items, such as soft extrusions and building sheet, find their proper level without direct relationship to the primary price.

Vanadium

Sales of vanadium metal are booming over last year, reports Union Carbide Metals Co. The company's fine metals and chemicals department reports that seven times as much metal was shipped in the first 11 months of 1959 as in all of 1958.

The company attributes part of this boost to "substantially increased purity."

Union Carbide also notes an increase in customer-requested mill products. For instance, this year the company rolled sheet as wide as 18 in. And an order for several hundred lb was recently filled.

Magnesium

October was a good month, says the Magnesium Assn. Shipments of wrought products topped 1000 tons for the third consecutive month. They totaled 1110 tons, compared to 991 tons in October 1958.

Tin prices for the week: Dec. 2—99.50; Dec. 3—99.375; Dec. 4—99.375; Dec. 7—99.125; Dec. 8—99.00.*

* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	30.00	9/1/59
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	12.80	11.80	8/24/59
Lead, N. Y.	13.00	12.00	8/24/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	12.50	12.5-13	11/2/59
Zinc, N. Y.	13.00	13-13.5	11/2/59

ALUMINUM: 99% ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 147.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
8- 8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size*	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	139	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.75-$6.25; alloy, $7.75-$10.00; Bar, HR or forged, commercially pure, $4.25-$5.00; alloy, $4.25-$7.50; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.40
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 33.30 to 42.00
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $215 to $217
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $20 to $22
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.25
- No. 123 ..... 28.75

80-10-10 ingot
- No. 305 ..... 35.25
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 44.00
- No. 215 ..... 40.75
- No. 245 ..... 36.00

Yellow ingot
- No. 405 ..... 24.75

Manganese bronze
- No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.00-25.25
- 0.60 copper max. 24.75-25.00

Piston alloys (No. 132 type)..26.75-27.75
No. 12 alum. (No. 2 grade)....23.50-24.00
108 alloy 24.00-24.50
195 alloy 26.50-27.50
13 alloy (0.60 copper max.)....24.75-25.00
AXS-679 (1 pct zinc) 23.75-24.75

(Effective Dec. 7, 1959)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 24.00-25.00
Grade 2—92-95% 22.75-23.75
Grade 3—90-92% 21.75-22.75
Grade 4—85-90% 21.25-22.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26¼	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29½
No. 2 copper wire 26
Light copper 23⅜
*Refinery brass 24¼
Copper bearing material 23¼
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29½
No. 2 copper wire 25½
Light copper 23½
No. 1 composition 23
No. 1 comp. turnings 22¼
Hvy. yellow brass solids 16¾
Brass pipe 16¼
Radiators 18

Aluminum

Mixed old cast. ..... 14 —15
Mixed new clips ..... 16½—17
Mixed turnings, dry ..... 14½—15½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 25 —25½
No. 2 copper wire ..... 22 —22½
Light copper ..... 20½—21
Auto radiators (unsweated). 14½—15
No. 1 composition ..... 18½—19
No. 1 composition turnings... 17 —17½
Cocks and faucets ..... 15 —15½
Clean heavy yellow brass ... 13 —13½
Brass pipe ..... 15 —15½
New soft brass clippings .... 15¼—15¾
No. 1 brass rod turnings .... 12½—13

Aluminum

Alum. pistons and struts .... 7½— 8
Aluminum crankcase ..... 11¼—11¾
1100 (2s) aluminum clippings 15 —15½
Old sheet and utensils ..... 11¼—11¾
Borings and turnings ..... 7 — 7½
Industrial castings ..... 11¼—11¾
2020 (24S) clippings ..... 12½—13

Zinc

New zinc clippings ..... 6¼— 6¾
Old zinc ..... 4¼— 4¾
Zinc routings ..... 3 — 3¼
Old die cast scrap ..... 2½— 2¾

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 30-32
Clean Monel turnings 20-23
Old sheet Monel 26-28
Nickel silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 8¾— 9¼
Battery plates (dry) ..... 4¼— 4½
Batteries, acid free ..... 2½— 2¾

Miscellaneous

Block tin ..... 77 —78
No. 1 pewter ..... 59 —60
Auto babbitt ..... 40 —41
Mixed common babbitt ..... 9¾—10¼
Solder joints ..... 14 —14½
Siphon tops 42
Small foundry type ..... 10¼—10¾
Monotype ..... 10¼—10¾
Lino. and stereotype ..... 9¼— 9¾
Electrotype ..... 7¾— 8¼
Hand picked type shells .... 6 — 6½
Lino. and stereo. dross ..... 2¾— 3¼
Electro dross ..... 2¾— 3¼

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Dec. 7, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective Dec. 7, 1959)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.675 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harber, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P1*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Dec. 7, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**	**Blk.**	**Gal.**
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*2.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.50¢ per lb.

(Effective Dec. 7, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B1*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Rolled (Coiled or Cut Length) Semi-Processed	Cold-Rolled (Coiled or Cut Length) Fully Processed
Field		9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Dec. 7, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4****	173	190	177	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.60	10.15
Rankin, Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. ** 11-12¢ zinc. *** .10¢ zinc. † Plus zinc extras. ‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	48.25
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine ½" and smaller x 3" and shorter	55	57	61	62
½" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in. and smaller	65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws	*Discount (Packages)*
	Full Finished H. C. Heat Treat
New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. 25,000-and over	60	..
5/16 to ½" diam. incl. 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	46.00
Electrodeposited	38.50
Brass, 80-20, ball anodes, 2000 lb or more	51.50
Zinc, ball anodes, 2000 lb lots (for elliptical add 1¢ per lb)	18.75
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30

Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	24.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	.10	9.90	10.10	10.16	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.91	9.79	10.00	9.59	13.14	16.76	.....	.....	.....
Boston**	.10	10.52	11.27	11.87	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.80	10.50	11.40	11.30	10.25	10.40	9.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.16	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.69[1]	9.89	11.09	10.47	8.88	9.67	8.90	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		9.65	9.65	.....	10.85	9.65	9.35	8.90	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.30	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.50	11.45	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.99	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.50	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	9.07	10.73	11.48	10.73	9.00	9.76	9.17	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	8.95	9.46	10.62	10.47	8.75	9.48	8.85	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅛" to 2⅛"; cold drawn—15/16" to 2⅛" round; Hot-rolled 4140—⅞" to 2⅛" round, cold drawn—15/16" to 2⅛" round.

†† 10¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Dec. 7, 1959)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8.*

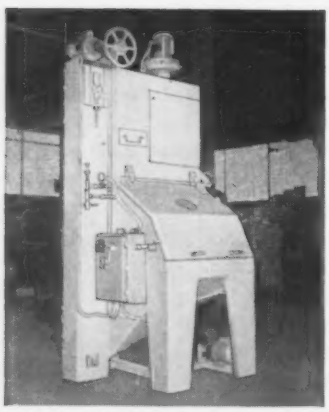
Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective Dec. 7, 1959)

MACLEOD



BLAST CLEANING EQUIPMENT

•

CUSTOM DESIGNED *to your* INDIVIDUAL REQUIREMENTS

•

Since 1897, MACLEOD has won an excellent reputation as a manufacturer of "tailor-made" blast cleaning equipment. The shot-peening machine shown above, for instance, was specially designed and built to meet the customer's exact requirements and specifications. Among other distinctive features, the machine includes an elevator and a dust collecting section. Shot peening cycle is timer-controlled and turntable is motor driven. Write for descriptive literature on all MACLEOD Blast Cleaning Equipment—Rooms, Cabinets, Machines, and Dust Arresters—that can be custom-designed to your individual requirements.

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MACHINE WORK & SPECIAL MACHINE BUILDING

We have large, medium and small machine tools available for machine work and the building of special machinery.

We will be pleased to receive your inquiries.

SUN SHIP
BUILDING & DRYDOCK COMPANY
CHESTER, PA.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D piate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 2000 lb up to carloads	17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	24.95	22.00
98% Si, 1.0% Fe	24.45	21.50

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.65

(Effective Dec. 7, 1959)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1 54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, fo.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

RAILWAY EQUIPMENT
FOR SALE
Used "As Is" and Reconditioned

RAILWAY CARS
All Types

SERVICE-TESTED
FREIGHT CAR REPAIR PARTS
For All Types of Cars

3—DIESEL-ELECTRIC LOCOMOTIVES
General Electric
44-Ton Standard Gauge
In ICC Operating Condition

10 Covered Hopper Cars
70-Ton Capacity, Standard Gauge

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125 Ton, 52'6", Buffalo

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6,000- 8,000- and 10,000-Gallon
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New York Office
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New York 17, N. Y.
Phone: YUkon 6-4766

"ANYTHING containing IRON or STEEL"

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

(3)—3500-KW Allis-Chalmers 5-unit sets consist of (2) 17-50 KW Gen., 350/700-VDC, (1) 5000-HP syn. motor, 13800/6900/4160-V, 3 hp., 60 cy., (2) exciter generators.

• • •

(1)—S. & S. 5-unit set consists of—(1) 2500-HP syn. motor, 11000/4160-V, 3 ph., 60 cy. (1) 1060-KW Gen. 600-VDC, (2) 760-KW Gen. 600-VDC, (1) exciter gen. (Will split this set to fit your requirements.)

• • •

(1)—200 KW set consisting of (2) 1000-KW gen. 600-VDC, (1) 2500-HP syn. motor, 11000/-4160-V., 3 ph., 60 cy.

• • •

(1)—1875-KW Whse. 2-unit set—(1) 250-VDC gen., (1) 2700-HP syn motor, 13800/6900/-4160-V., 3 ph., 60 cy.

• • •

(1)—1250-KW Gen., Elec. 2 unit set—(1) 132/265-VDC gen., (1) 1750-HP syn. motor, 4160-V., 3 ph., 60 cy.

• • •

(1)—850-KW Gen. Elec. 2-unit set—(1) 250/300-VDC gen., (1) 1250-HP syn. motor, 13800/-6900/4160-V., 3 ph., 60 cy.

MOTORS

(1)—2200 H.P. Westinghouse motor, 600 VDC., 92/132 R.P.M.

• • •

(2)—600 HP, Allis Chalmers motors, 600 VDC, 300/600 R.P.M.

T. B. MAC CABE COMPANY
4302 Clarissa St., Philadelphia 40, Penna.

Cable Address "Macsteel" Philadelphia, Pa.
Phone Davenport 4-8300

Used Machines Gave This Firm a Start

When the Bedford Gear and Machine Products, Inc., was formed, it could only buy used machinery.

Today, the company is on solid ground. The success is attributed to the high quality of the early tools.

▪ Twelve years ago a group of seven men from the gear cutting department of a big Cleveland company decided they ought to go into business for themselves. They hocked everything they had to scrape up a little over $50,000 worth of credit. With this they bought a dozen war surplus machine tools. They naturally went into the business they knew best—cutting gears.

The former gear cutting department boss—Bernard Raimer—became president of the new Bedford Gear and Machine Products Inc. In daytime he was out selling. At night he put on his overalls and made the gears he sold.

A Big Ten—Sales in the first year were $150,000. But 10 years later, in 1957, sales peaked at $1.5 million. Bedford Gear now has 35,000 sq. ft. of floor space compared to the original 1500. And there are 110 employes and 162 pieces of heavy machinery.

"We wouldn't be in business if it weren't for good used machinery," Mr. Raimer says "After we were going about a year and a half and needed more than our original surplus, we contacted a good Cleveland dealer, Elmer W. Pfeil. He was able to pick up exactly what we wanted. Much of it we bought sight unseen to save cost."

Good Team — "The machines had to be right, too. We were dealing in a highly competitive field of precision gears to strict military specifications and one bad job could have given us a bad name which would ruin the business. But good men and good tools carried the day."

Bedford Gear's first job was a subcontract for some sprockets for a downtown Cleveland firm making governors. With a successful job here the firm landed another major order from an electric motor manufacturer in town for motor caps and frames, commutator rings, shafts and gears.

Breakthrough — The big break came shortly after when Bedford landed an order for 800 precision gears for aircraft parts which needed government certification. Of the 800 only 16 needed slight reworking. This put them on the map with a good reputation among Cleveland firms.

And Now—Today Bedford Gear turns out its original product of gears ranging from a miniscule ⅛ in. diam for fine machine tools to 36 in. diam for earth-movers. It also turns out spline shafts, gear heads and chuck jaws—all in a competitive field.

Bedford Gear now is off from its 1957 peak. But it has capacity for about $2 million worth of business per year and expects volume to hit $5 million to $8 million in the next decade, according to Mr. Raimer.

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15 ton Shepard Niles	37'9" Span	230/3/60 A.C.
15 ton Milwaukee	56' Span	440/3/60 A.C.
15 ton Shepard Niles	55'6" Span	220/3/60
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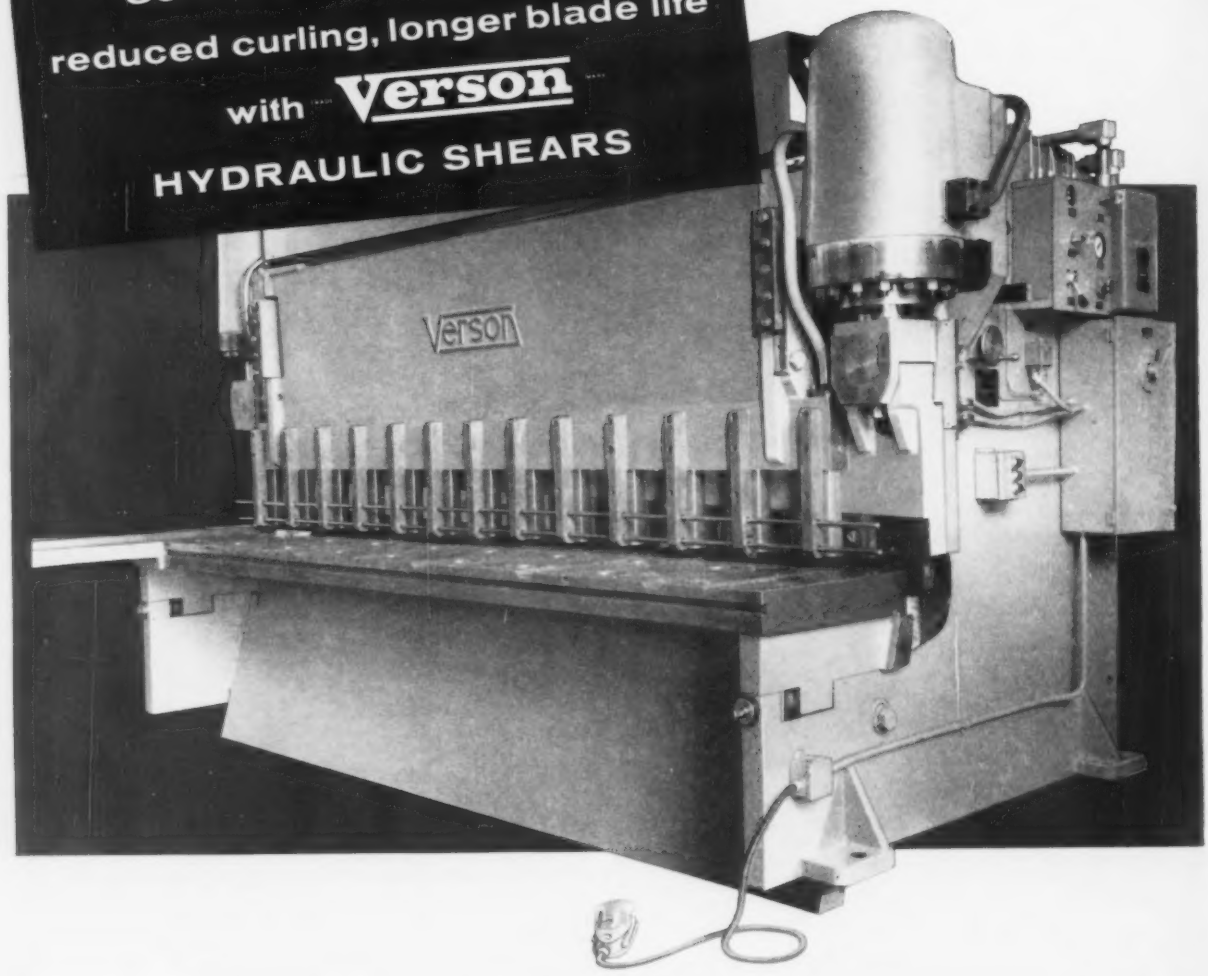

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